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Experiment Station**

General Technical
Report NE-108

New England Wildlife:
Habitat, Natural History, and Distribution

Richard M. DeGraaf
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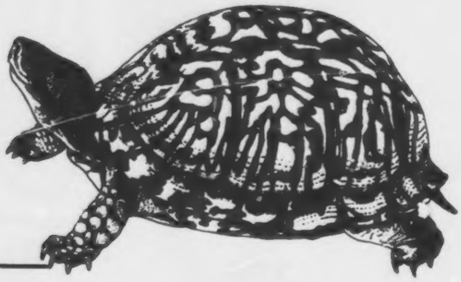
Amphibians



Reptiles

Birds

Mammals

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ABSTRACT

Describes natural history profiles of New England wildlife species and their associations with forested and nonforested habitats. Provides a data base that will enable forest managers or wildlife biologists to describe the species or groups to be found in a given habitat.

THE AUTHORS

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Slightly revised June 1987

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PREFACE

This report is a contribution to the Wildlife and Fish Habitat Relationships Program of the U.S. Department of Agriculture, Forest Service. Professional concerns for wildlife community, management, as well as recent legislation, such as the National Forest Management Act of 1976, have given impetus to the Program, which seeks to maintain viable populations of all existing native vertebrates on lands administered by the Forest Service. To achieve this broad goal, the habitats, life histories, and distributions of all vertebrates that potentially inhabit management units must be compiled in a standard habitat classification scheme. When species occurrences have been verified for the area under consideration, management indicator species can be monitored to detect population changes. Indicator species must include federally listed endangered species; species whose special habitat components may be affected by management practices; species commonly hunted, fished, or trapped; and, finally, species whose population changes likely reflect the impacts of management activities on other wildlife species in the community. While routine monitoring of indicator species to detect population changes of other species is a future goal, all efforts toward the development of such a procedure must be based on accurate biological knowledge and habitat associations. Thus this report, the stimulus for which came from the development of guidelines for the management of wildlife in the Blue Mountains of Oregon and Washington (Thomas 1979). The format closely follows that of Verner and Boss (1980) in order to contribute to a national compilation of forest-wildlife habitat relationships.

Our approach was to compile the available information on the life history, distribution, and habitat for each inland vertebrate occurring in New England and then obtain critical reviews by known experts. This report is based partly on information that was originally available in three separate volumes on northeastern wildlife. The original volumes were limited and were intended for USDA Forest Service use in wildlife habitat management on the Green Mountain and White Mountain National Forests:

DeGraaf, R.M.; Witman, G.M.; Lanier, J.W.; Hill, B.J.; Keniston, J.M. Forest habitat for birds of the Northeast. Milwaukee, WI: Forest Service, Eastern Region; 1980. 589 p.

DeGraaf, R.M.; Witman, G.M.; Rudis, D.D. Forest habitat for mammals of the Northeast. Milwaukee, WI: U.S. Department of Agriculture, Forest Service, Eastern Region; 1981. 182 p.

DeGraaf, R.M.; Rudis, D.D. Forest habitat for reptiles and amphibians of the Northeast. Milwaukee, WI: U.S. Department of Agriculture, Forest Service, Eastern Region; 1981. 239 p.

We trust that this information contributes to the sound management of forest wildlife communities in New England and elsewhere. We urge researchers to field check the information in the species/habitat matrices; such work is vital before the application of indicator species to wildlife management.

INTRODUCTION

New England's forests provide a diversity of habitats that support a range of wildlife communities. Now mostly forested, the New England landscape has changed dramatically in the last 350 years. Once covered by the primeval forest, the land was cleared for agriculture, slowly until about 1750, then at an increased pace until 1820, when 75 percent of the arable land in southern and central New England was in farm crops and pasturage. A century later, these figures were reversed, and New England was about 75 percent forested — the result of an era of farm abandonment that began in 1830 with the opening of rich farmlands in Ohio via the Erie Canal. The building of railroads, the Civil War, and even the California gold rush all contributed to the exodus of farmers from the stony hills so arduously brought under cultivation.

The reversion of the land to forest began at once, producing the "old field" pine stands that reached harvestable size just after the turn of the 20th century. Today, New England supports a diversity of forest cover types. Major types include eastern white pine/northern red oak/red maple, red spruce, paper birch, northern hardwoods, spruce-fir, (Fig. 1). In some areas, admixtures of aspen, paper birch, red maple, hemlock, as well as many open, wetland, and other habitats occur.

Forest management activities — primarily timber harvest, fuelwood management, and road building — are the dominant influences on wildlife habitats. This publication presents the habitat associations of all inland species of New England wildlife in one habitat classification scheme. This information will provide forest managers, wildlife biologists, and other resource specialists with a ready source of information on the habitat needs of all forest wildlife species in New England, and thereby will assure the continued existence of all important, appropriate wildlife habitats in the managed forests of New England. The key to planning the management of all wildlife species is to know their habitat requirements and to provide them in a variety of combinations that meet the needs of as many species as possible. To this end, wildlife must be viewed as wildlife communities that respond over time to habitat changes.

Management of wildlife on public lands is a responsibility shared by various state and federal land management agencies. By agreement, states generally manage or regulate wildlife populations and federal agencies manage habitats. Naturally, close cooperation is required to meet wildlife management goals. This manual provides only habitat information — wildlife population goals must be developed through the coordination or activities of all involved agencies.

Traditionally, wildlife management — whether on federal, state, or private lands — was concerned primarily with game species. The reason for this emphasis is simple — the basic sources of funds for wildlife management were derived from hunters' expenditures, purchase of licenses, and payment of an excise tax on sporting arms and ammunition through the Pittman-Robertson Act, otherwise known as the "Federal Aid to States in Wildlife Restoration Act" (P.L. 75-415, as amended).

Recent legislation has mandated that ecological considerations have an important role in forest management and related resource-use decisions. These statutes that require that land management practices recognize all wildlife include:

Fish and Wildlife Coordination Act (16 U.S.C. 661-666c, 1934 as amended): Seeks to protect fish and wildlife habitats by requiring the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to review and report on proposed water and associated land development projects. Evaluations cover projects receiving funds through the Federal River and Harbor Act of 1899, Sections 402 and 404 of the Federal Water Pollution Control Act as amended 1972, and other appropriate Acts.

Multiple Use and Sustained Yield Act of 1960 (P.L. 86-517): Directs the USDA Forest Service to consider all renewable resources in conjunction with one another.

National Environmental Policy Act of 1969 (P.L. 91-190): Encourages productive harmony among man and his environment; requires that any federally financed project be evaluated and environmental impacts, including those on fish and wildlife, and alternative opportunities, be identified.

Endangered Species Act of 1973 (P.L. 93-205): Calls for conservation of endangered and threatened species, and of the ecosystems supporting them. Critical habitats required to assure survival and restoration of endangered species are identified, delineated, and maintained.

Sikes Act of 1974 (P.L. 93-452): Calls for new directions and cooperation with the states in planning and management of wildlife habitat on federal lands.

Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378): Directs the USDA Forest Service to inventory natural resources in the National Forest System and provide comprehensive plans for their management.

Federal Land Policy and Management Act of 1976 (P.L. 94-579): Established national policy to retain rather than dispose of the National Resource Lands, and directs that those lands be inventoried, uses be planned on a multiple-use and sustained-yield basis, and that lands be managed on a sound ecological basis, with habitat provided for fish and wildlife. Land use plans and regulations must include protection of public land areas of critical en-

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WHITE PINE NORTHERN RED OAK RED MAPLE

Petersham, Massachusetts
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vironmental concern. This refers to delineated areas of public lands where special management attention is required to protect and prevent irreparable damage to important fish and wildlife resources or other natural systems or processes. In resource inventories, priority shall be given to designation and protection of areas of critical environmental concern.

National Forest Management Act of 1976 (P.L. 94-588): Requires, among other things, that research be conducted to ensure that land management systems will not substantially impair land productivity.

Wildlife habitat improvement continues to be an integral part of the management of the national forests. All wildlife species have important roles — functions — in ecosystems, and so, must be considered in land management practices. The broad objective of the wildlife habitat program of the Eastern Region of the Forest Service is to maintain a diversity of habitats to ensure that populations of all native wildlife species and communities continue to be represented on the national forests.

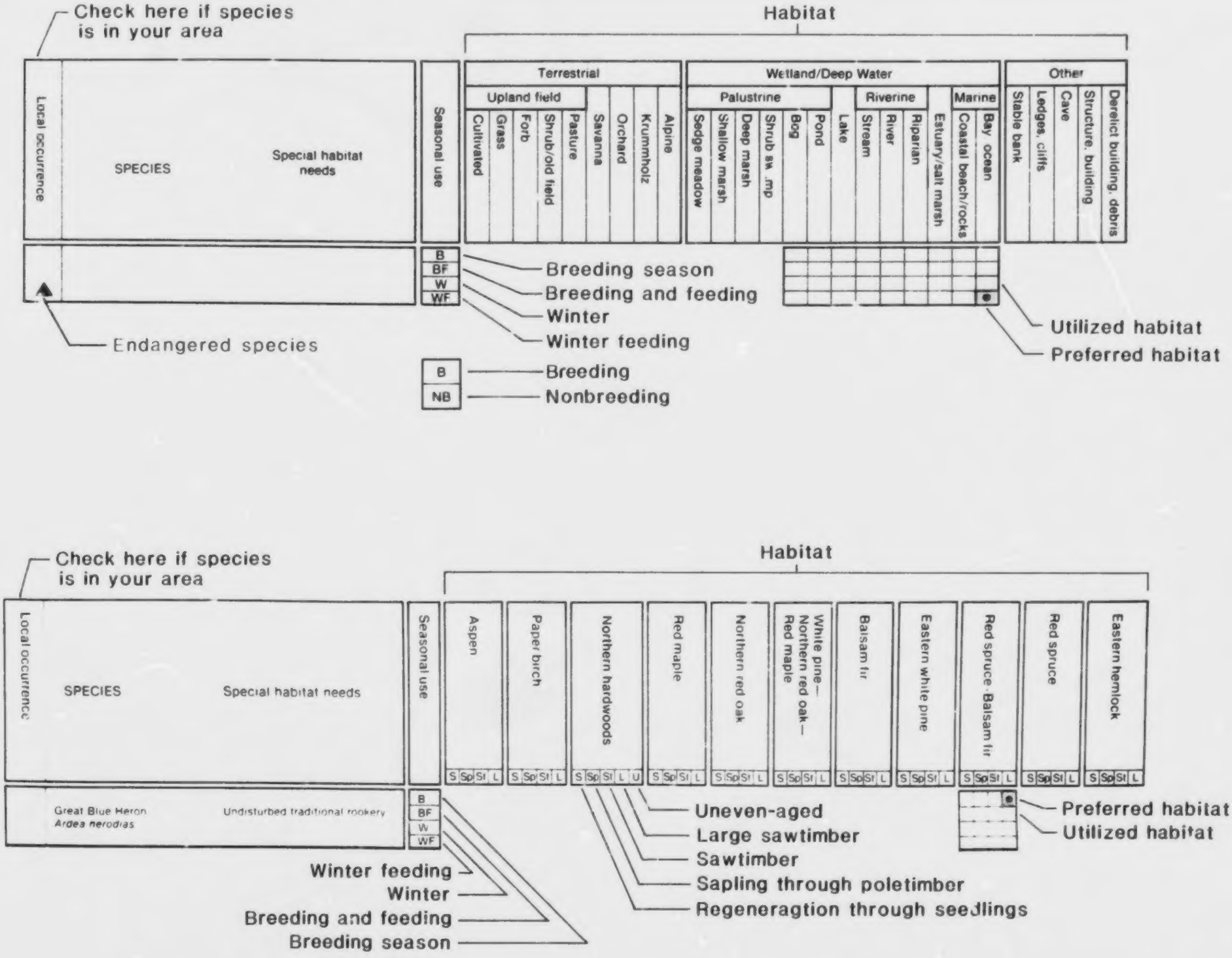
Species Included

Notes on life history and habitat associations of 338 inland (nonmarine) species, grouped into sections by taxonomic class, are included in this report. Species within each class are arranged in phylogenetic order. Special status designations for certain species are listed in the Appendix. Additional groups of strictly coastal, migratory, and accidental species are not covered in detail but are also listed in the Appendix.

Species/Habitat Matrices

Species habitat matrices present summary information in a simple, condensed, tabular form (Fig. 2). These matrices are the most important parts of the report. Familiarize yourself with their arrangement and the ele-

Figure 2.—The key to elements in the species/habitat matrices.


Check here if species is in your area
Habitat
Local occurrence
SPECIES
Special habitat needs
Seasonal use
Terrestrial
Upland field
Cultivated
Grass
Forb
Shrub/old field
Pasture
Savanna
Orchard
Krummholz
Alpine
Wetland/Deep Water
Palustrine
Sedge meadow
Shallow marsh
Deep marsh
Shrub swamp
Bog
Pond
Lake
Riverine
Stream
River
Riparian
Estuary/salt marsh
Marine
Coastal beach/rocks
Bay ocean
Other
Stable bank
Ledges, cliffs
Cave
Structure, building
Derelict building, debris
B
BF
W
WF
Breeding season
Breeding and feeding
Winter
Winter feeding
Endangered species
Utilized habitat
Preferred habitat
B
NB
Breeding
Nonbreeding
Check here if species is in your area
Habitat
Local occurrence
SPECIES
Special habitat needs
Seasonal use
Aspen
Paper birch
Northern hardwoods
Red maple
Northern red oak
White pine—Northern red oak—Red maple
Balsam fir
Eastern white pine
Red spruce-Balsam fir
Red spruce
Eastern hemlock
S Sp St L
S Sp St L U
Great Blue Heron
Ardea herodias
Undisturbed traditional rookery
B
BF
W
WF
Uneven-aged
Large sawtimber
Sawtimber
Sapling through poletimber
Regeneragtion through seedlings
Preferred habitat
Utilized habitat
Winter feeding
Winter
Breeding and feeding
Breeding season

ments that they contain. Two sets of matrices are provided, one for forest cover types, another for nonforest types — terrestrial, wetlands, and other habitats.

Special Habitat Features

Special habitat features are listed for many species. These features are considered to be essential for that species to occur regularly or to reproduce. Many species are generally associated with a given forest type or group of types — cavity-nesting waterfowl, for example. But the special habitat feature — here it is water — must also be present. Thus, the species/habitat associations must be viewed as a complex of within-stand or special habitat requirements occurring in species' overall or general habitat. Some special habitat features can be provided through forest management — the aforementioned cavities, for example, either by delayed rotation or streamside buffer strips where timber harvest is prohibited — but the stream or pond cannot.[1] The special habitat features entered in the matrices are taken from the larger classification below.

Aquatic

Open water
Shallow marsh 1.5 feet (0.5 m)
Moderate depth 1.5 to 6 feet (6.5 to 1.8 m), at least 1 acre (0.4 ha)
Deep marsh > 6 feet (1.8 m)
Submerged vegetation - typically coontail (*Ceratophyllum*)
Floating vegetation -- typically spatterdock (*Nuphar*) or pond lily (*Nymphaea*)
Emergent vegetation — cattail (*Typha*) or bulrush (*Scirpus*)
Shrubs at water's edge
*Dead standing trees 6 to 8 inches (1.5 to 20 cm) d.b.h.
*Dead standing trees 9 to 12 inches (23 to 30 cm) d.b.h.
*Dead standing trees 13 to 19 inches (33 to 48 cm) d.b.h.
*Dead standing trees > 20 inches (51 cm) d.b.h.
Down and decaying trees at present
Islands present
Springs
Stream banks — grass — topped, (stable)
Banks
Relatively stable water level
Intermittent stream flow
Small stream < 10 feet (3 m) wide
River
*Light shade on water — 10 to 25 percent
*Moderate shade on water — 25 to 75 percent
*Deep shade > 75 percent
Bedrock bottom
Boulder bottom
Cobble bottom
Gravel bottom
Sand bottom
Mud bottom
Organic bottom
Flow < 50 cubic feet per second (1.5 m^3 per second) mean annual flow
Flow between 50 to 1,000 cubic feet per second mean annual flow (1.5 to 28 m^3 per second)
Flow between 1,000 to 5,000 cubic feet per second mean annual flow (28 to 142 m^3 per second)
Flow > 5,000 cubic feet per second mean annual flow (140 m^3 per second)
Water temperature 32 °F to 50 °F (0 °C to 10 °C)
Water temperature 51 °F to 70 °F (11 °C to 21 °C)
Water temperature 71 °F to 80 °F (22 °C to 27 °C)
Water temperature > 81 °F (27 °C)
High 0_2 concentrations — > 9 ppm (9 mg/L)
Moderate 0^2 concentrations — 6 to 9 ppm (6 to 9 mg/L)
Low O_2 concentrations — < 6 ppm (6 mg/L)
High pH level — > 8.4
Moderately high pH level — 7.1 to 8.4
Neutral pH — 7.0
Moderately low pH — 6.9 to 5.6
Low pH — < 5.6

Terrestrial characteristics (stand area)

*1 to 10 acres (0.4 to 4 ha)
*11 to 50 acres (4.5 to 20 ha)
*51 to 200 acres (21 to 80 ha)
*201 to 500 acres (81 to 200 ha)
*501 to 1,000 acres (22 to 400 ha)

Locators

*Forest interior
Aquatic — terrestrial ecotone
*Opening — shrub land ecotone
*Opening — wood and ecotone
*Shrubland — forest ecotone
*In opening interior

Canopy features

*None
Scattered < 1 percent to 4 percent closure
*Open 5 percent to 30 percent closure
*Moderately closed 30 percent to 60 percent
*Closed > 60 percent closure

Dead trees

*< 6 inches (15 cm)
*6 to 8 inches (15 to 20 cm)
*9 to 12 inches (23 to 30 cm)
*13 to 19 inches (33 to 48 cm)
*> 20 inches (51 cm)

---

[1] Special habitat features that can be provided through forest management are marked with an asterisk (*).

Structure

*Canopy only
*Canopy with one intermediate layer
*Canopy with two intermediate layers

Other features (man made)

Abandoned buildings
Dumps
Railroad grades
Power lines
Manure piles
*Sawdust piles
Mine spoils

Ground cover type

Exposed soil
Moss
Litter
Rocks
*Fallen logs
*Slash piles
Herbaceous vegetation
Vines
Brambles
Fence rows
*Ericaceous shrubs
*Coniferous shrubs
*Deciduous shrubs
*Mixed shrubs

Ground cover density

*Very light, 10 percent or less
*Light, 11 percent to 30 percent
*Medium, 31 percent to 50 percent
*Moderately high, 51 percent to 70 percent
*High, 71 percent

Opening type

Lawn, golf course, and so on
Cultivated
Fallow field
Pasture
*Log landing
*Abandoned road
Gravel pit
Fire
*Blowdown
Wet meadow

Soil texture

Bedrock -- outcrops
Boulders
Cobbles
Gravel
Sand
Loam
Silt
Clay

Soil permeability

Rapid
Moderate
Slow

Soil pH

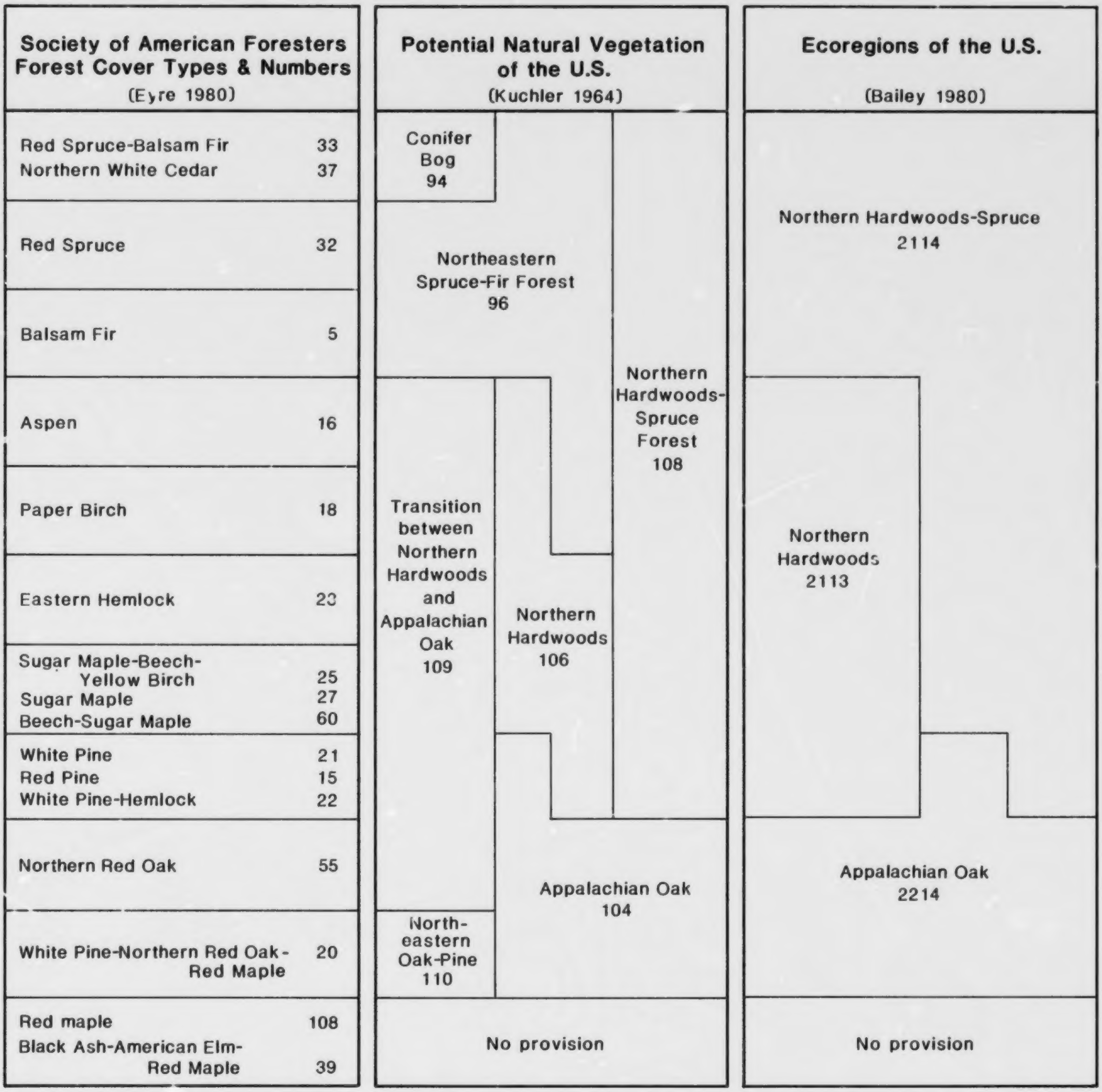
Strongly acid, < 4.5 to 5.0
Medium acid, 5.1 to 6.5
Neutral, 6.6 to 7.3
Medium alkaline, 7.4 to 8.4
Strongly alkaline, 8.5 +

Forest Cover Types

The forest cover types used to describe forest habitats are based on those in *Forest Cover Types of the United States and Canada* (Eyre 1980). Similar types are grouped, especially when they reflect similarities in wildlife species distribution and habitat selection. We have included descriptions of the types as they pertain to New England. The translation of these types into two other major vegetation classifications is shown in Figure 3. Forest development is indicated by size class as follows:

S	*Regeneration through seedlings*: Live trees and associated vegetation less than 1.0 inch (2.5 cm) d.b.h. and at least 1 foot (30 cm) in height.
Sp	*Sapling through poletimber*: Saplings are live trees 1.0 to 3.9 inches (2.5 to 9.9 cm) d.b.h.; poles are live trees 4.0 to 8.9 inches (10.0 to 22.0 cm) d.b.h. for softwoods and 4.0 to 11.9 inches (10.0 to 30.0 cm) d.b.h. for hardwoods. The matrix assumes that stands are fully stocked, that is, contain approximately 75 square feet of basal area per acre.
St	*Sawtimber*: A stand with at least half of the stocking in sawtimber-size trees — at least 9.0 inches (23 cm) d.b.h. for softwoods or 12.0 inches (31 cm) for hardwoods.
L	*Large sawtimber*: A stand with at least half of the stocking in large-sawtimber trees — at least 20 inches (51.0 cm) d.b.h. for softwoods and 24 inches (61.0 cm) d.b.h. for hardwoods.
U	*Uneven-aged*: Stands of northern hardwood-cover types that contain trees of all size classes.

Figure 3.—Translation of the Society of American Forester's cover types into two other major vegetation classifications used in New England.


Society of American Foresters Forest Cover Types & Numbers
(Eyre 1980)
Red Spruce-Balsam Fir 33
Northern White Cedar 37
Red Spruce 32
Balsam Fir 5
Aspen 16
Paper Birch 18
Eastern Hemlock 23
Sugar Maple-Beech-Yellow Birch 25
Sugar Maple 27
Beech-Sugar Maple 60
White Pine 21
Red Pine 15
White Pine-Hemlock 22
Northern Red Oak 55
White Pine-Northern Red Oak-Red Maple 20
Red maple 108
Black Ash-American Elm-Red Maple 39
Potential Natural Vegetation of the U.S.
(Kuchler 1964)
Conifer Bog 94
Northeastern Spruce-Fir Forest 96
Northern Hardwoods-Spruce Forest 108
Transition between Northern Hardwoods and Appalachian Oak 109
Northern Hardwoods 106
Appalachian Oak 104
North-eastern Oak-Pine 110
No provision
Ecoregions of the U.S.
(Bailey 1980)
Northern Hardwoods-Spruce 2114
Northern Hardwoods 2113
Appalachian Oak 2214
No provision

These apply to all forest cover types *under even-age management,* with one exception. Only in the northern hardwoods cover-type group do we list wildlife habitat associations for uneven-aged stands.

Common and scientific names of trees follow Little's (1979) *Checklist of United States Trees.* Names of understory plants follow *Gray's Manual of Botany* (Fernald 1950).

The forest cover types and groups are:

- *Aspen*: This type includes quaking aspen (*Populus tremuloides*) and bigtooth aspen (*Populus grandidentata*) but in New England, quaking aspen is more likely to occur in pure stands. Common associates are paper birch (*Betula papyrifera*) and pin cherry (*Prunus pensylvanica*), which when occurring in admixture, die out early. These species occur on a variety of sites and soil types. The aspen type occurs on most soil types except very dry sands or very wet swamps. Aspen is unique in that almost all stands originate as suckers arising from existing root systems. It will sometimes reproduce from seed on burns, clearcuts, and other scarified sites.

Aspen is a relatively short-lived pioneer type — it does not reproduce under its own shade. On dry sites it is replaced by red pine, red maple, or oaks, on mesic sites by white pine, and on fertile sites by northern hardwoods, and on fertile wet sites by balsam fir (Brinkman and Roe 1980).

- *Paper birch*: Paper birch is pure or dominant. Associated species include quaking and bigtooth aspen, balsam fir, red spruce (*Picea rubra*), white pine (*Pinus strobus*), yellow birch (*Betula alleghaniensis*) and, in southern New England, hemlock (*Tsuga canadensis*). The type pioneers on burned areas and clearcuts, and grows best on deep, fertile, well-drained sites. Raspberries and blackberries (*Rubus* spp.) make up a high proportion of the ground cover at the time of establishment of paper birch stands. These are shaded out in about 10 years, but pin cherry can persist for 30 or more years. Paper birch is succeeded by spruce-fir in northern parts of its range, and to the south by northern hardwoods and hemlock on fertile, well-drained sites (Safford 1980).

- *Northern hardwoods* (including sugar maple, sugar maple/beech/yellow birch, and beech/sugar maple): True northern hardwoods are dominated by sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), and yellow birch and occur widely as a pure type in northern New England. It grades into a mixed hardwood or transition type in southern New England; associated species throughout the region include basswood (*Tilia americana*), red maple (*Acer rubrum*), hemlock, white ash (*Fraxinus americana*), white pine, balsam fir, black cherry (*Prunus serotina*), paper birch, sweet birch (*Betula lenta*), and red spruce. Northern hardwood is the basic hardwood type in northern New England, and occurs to an elevation of 2,500 feet (760 m). It prefers fertile loamy soils and good moisture conditions. Striped maple (*Acer pensylvanicum*), witch-hazel (*Hamamelis virginiana*), and hobblebush (*Viburnum alnifolium*) are common in the understory throughout the region. Best development of the type occurs on moist, fertile, well-drained loamy soils. On drier sites, beech becomes more prominent. On wet sites, the type blends into a red/yellow birch/hemlock or a red spruce mixture. The type tends to be climax. From New England to Pennsylvania, the beech-nectria complex has gradually reduced the proportion of beech in many stands (Berglund 1980).

- *Red Maple*: Red maple (*Acer rubrum*) is pure or dominant. In New England, red maple and associated species are common on wet sites; the type is essentially pure in southern New England. Associates are yellow birch, balsam fir, and sugar maple in northern New England; black gum (*Nyssa sylvatica*), sycamore (*Platanus occidentalis*), and silver maple (*Acer saccharinum*) in southern New England. In New England and the Upper Peninsula of Michigan, it occupies moist to wet muck or peat soils in swamps, depressions of slow drainages or along sluggish streams, and so is often found as an inclusion in northern hardwoods on wetter sites (Powell and Erdmann 1980). It can be differentiated readily from northern hardwoods by the absence of beech and the increased proportion of yellow birch and red spruce.

- *Northern red oak*: Northern red oak (*Quercus rubra*) accounts for a majority of the stocking. Associates vary according to site and locale, and include black oak (*Quercus velutina*), scarlet oak (*Quercus coccinea*), and chestnut oak (*Q. prinus*), hickories (*Carya spp.*), and red maple. In New England, the type has a spotty distribution, occupying ridge crests and upper north slopes. On better sites, associates are black cherry, sugar maple, white ash (*Fraxinus americana*), and American beech. The type is rare in northern New England and reaches best development in New England in western Massachusetts and northern Connecticut on loam and silt-loam soils. The type is sub-climax — shade tolerant species such as beech and sugar maple increase in proportion over time (Trimble 1980).

- *White Pine/Northern Red Oak/Red Maple*: northern red oak, Eastern white pine (*Pinus strobus*), and red maple predominate; white ash is the most common associate, but others include paper birch, yellow birch (*B. alleghaniensis*   ), and sweet birch (*B. lenta*), sugar maple, beech, hemlock, and black cherry. Occurs across southern and central New England to an elevation of 1,500 feet (450 m), generally on deep, well-drained fertile soils.

This type is common in the transition between northern hardwoods and spruce-fir types in northern New England, and between northern hardwoods and oak types — characteristic of central types — in southern New England. The type often follows "old field" white pine in New England, where hardwood seedlings and saplings form the understory (Baldwin and Ward 1980). Common understory shrubs include witch-hazel, alternate-leaf dogwood (*Cornus alternifolia*), mapleleaf viburnum (*Viburnum acerifolium*), mountain-laurel (*Kalmia latifolia*).

- *Balsam fir*: Balsam fir (*Abies balsamea*) is characteristically pure or predominant. There are many associates mostly on moist or wet-site soils in northern New England; these include paper birch, quaking and bigtooth aspen, red spruce, and in swamps northern white-cedar (*Thuja occidentalis*). In southern New England, hemlock and red maple are common associates. The type is common in northern New England, occurring on upland sites, on low-lying moist flats and in swamps. Pure stands result (usually) from heavy cutting, blowdown, or following infestation of spruce budworm. This type is common in northern New England, and may be climax in the zone below timberline. Only black spruce (*Picea mariana*) grows above it (Westveld 1953).

The type occurs extensively in Quebec, where five distinct subtypes are recognized. In the United States, the type is not as complex; however, balsam fir is an important component in the following types in northern New England: red spruce/balsam fir, black spruce, aspen, and paper birch. Common understory species include speckled alder (*Alnus rugosa*), mountain maple (*Acer spicatum*), and pin cherry (*Prunus pensylvanica*) among large shrubs and small trees. Low understory plants include Canada yew (*Taxus canadensis*), red raspberry (*Rubus idaeus var. strigosus*), blueberries (*Vaccinium spp.*), and hobblebush (Frank et al. 1980).

- *Eastern White Pine*: Eastern white pine is pure or usually predominant. We include red pine (*Pinus resinosa*) which has a spotty distribution throughout New England on sandy, gravelly or sandy loam soils, and white pine/hemlock, a common subtype in central and southern New England, where it occupies a range of soil types in cool locations such as ravines and north slopes (in the southern parts of its range). These other pine types are included primarily because they support similar wildlife communities.

Eastern white pine frequently occurs in pure stands; common New England associates on light soils are pitch pine (*P. rigida*), gray birch (*Betula populifolia*), quaking and bigtooth aspen, red maple, and white oak (*Quercus alba*). On heavier soils, paper birch, sweet birch, yellow birch, white ash, black cherry, northern red oak, sugar maple, hemlock, red spruce, and northern white cedar are associated in New England, but none are characteristic. The type is widespread in central New England from sea level to an elevation of 2,500 feet (760 m). This type occurs over a wide range of conditions and sites; establishment is often easier on poor sites because hardwood competition is less. Once established on better sites, white pine will usually grow faster than hardwoods.

White pine commonly pioneers on abandoned agricultural land in New England. The type seldom succeeds itself, but on dry sandy soils it may persist a long time and even approach permanence. On heavier soils, white pine is usually succeeded by northern hardwoods, white pine/hemlock, or white oak.

Eastern white pine is a major component of two other New England forest cover types — white pine/northern red oak/red maple, and white pine/hemlock — and occurs in various proportions in other types throughout the region.

In pure or almost pure white pine stands, the understory is composed primarily of ericaceous shrubs such as blueberries, huckleberries (*Gaylussacia* spp.), azaleas (*Azalea* spp.), and mountain-laurel. In New England, common ladyslipper (*Cypripedium* spp.) is common on light soils and highbush blueberry (*V. corymbosum*) on wetter sites (Wendel 1980).

- *Red Spruce/Balsam Fir*: The type may consist of red spruce and balsam fir or together they may predominate in a mixture of associates — the composition varies by site and disturbance history. We include here the northern white-cedar type and associates, which are commonly associated in northern New England. This is a northern New England type, occupying moderately to poorly drained flats, but not swamps. Associates are red maple, paper and yellow birch, and aspens, primarily, but also white pine, hemlock, and occasionally black spruce and tamarack (*Larix laricina*).

The type occurs near sea level in eastern Maine, from an elevation of 2,400 to 4,500 feet (730 to 1,370 m) in the White Mountains of New Hampshire, from an elevation of 2,500 to 3,800 feet (760 to 1,160 m) in the Green Mountains of Vermont, and occurs on the tops of some of the higher Berkshire Hills in western Massachusetts.

The type occurs on two kinds of sites in New England: (1) poorly drained flats and ridges or benches at lakeshores, streams, and swamps and bogs, and (2) well-drained to dry, shallow soils on steep, rocky, upper mountain slopes.

Stands are usually very dense; the ground may be essentially devoid of plants except for mosses and few seedlings of red spruce and balsam fir. Regenerated stands, however, produce a thick growth of blueberry (*V. angustifolium*), creeping snowberry (*Symphoricarpos mollis*), mountain-holly (*Nemopanthus mucronata*), raspberry (*Rubus* spp.), and downy serviceberry (*Amelanchier arborea*), among others (Griffin 1980).

- *Red spruce*: Red spruce is pure or accounts for a majority of the stocking; common associates in northern New England are balsam fir, paper and yellow birch, others include sugar maple, red maple, mountain-ash (*Sorbus americana*), eastern white pine and eastern hemlock. Red spruce occurs near sea level in eastern Maine and from an elevation of 1,500 to 4,500 feet (450 to 1,370 m) inland throughout northern New England on moderately well-drained to poorly drained flats (but not true swamps), and on well-drained slopes, including thinly soiled upper slopes. Red spruce pioneers on abandoned fields and pastures in northern New England, and on these fairly well-drained sites it is usually replaced by shade tolerant hardwoods, especially sugar maple and beech. Red spruce is long-lived; barring major disturbance is very stable, and older stands develop an uneven-aged character even though of even-aged origin. The understory is frequently sparse, or even absent; the ground beneath stands of red spruce is covered with tree litter and patches of short-lived red spruce seedlings.

Old-field red spruce contain a ground cover of bunchberry (*Cornus canadensis*) on wet sites and hobblebush on well-drained sites. Regenerated stands usually produce raspberries in abundance (Blum 1980).

- *Eastern Hemlock*: Eastern hemlock is pure or predominant over any associate, but associates are numerous; these commonly include beech, sugar maple, yellow birch, red maple, black cherry, white pine, northern red oak, white oak, sweet birch, and in northern New England, paper birch, balsam, fir, and red spruce. In southern New England the type prefers cool locations such as moist ravines and north slopes; in the northern parts of its New England distribution, warmer drier sites are tolerated. Occurs from sea level to an elevation of 3,000 feet (915 m) in New England.

Eastern hemlock is very shade-tolerant. Its long life span and ability to respond to release after almost two centuries of suppression have allowed the type to persist; early logging, and the fires that followed, greatly reduced the occurrence of this shallow-rooted climax species. Under mature stands understory development is sparse; openings to admit light commonly produce striped maple, hobblebush, mapleleaf viburnum, among others. False lily-of-the-valley (*Maianthemum canadense*) is probably the most common herb (Wiant 1980).

Terrestrial, Wetland, and Other Nonforest Habitat Types

The matrix of wildlife species occurrence in nonforest habitats includes entries for terrestrial, wetland, and other habitat types. Many wildlife species that occur in forest habitats either prefer or require one or more nonforest habitats, usually for breeding. For example, eastern American toads (*Bufo a. americanus*) and mole salamanders (*Ambystoma* spp.) occur throughout many woodlands, except for brief, critical breeding periods in wetlands.

The nonforest habitat types are:

- *Terrestrial:*

Upland Fields

Cultivated — tilled agricultural cropland

Grass — hayfields, etc.

Forb — broadleaved herbaceous cover, e.g., goldenrod (*Solidago*), sensitive fern (*Onoclea*), etc.

Old fields — abandoned agricultural fields reverting to forest, characterized by grasses, shrubs, small trees

Pastures — usually too wet or rocky for cultivation

Savanna — grasslands with shrubs and widely, irregularly scattered trees, resulting from either soil-moisture regimes or disturbances such as fire or grazing

Orchards — fruit trees, grassy ground cover

Krummholz zone — the transition zone from subalpine forest to alpine tundra characterized by dwarfed, deformed, wind-sheared trees

Alpine zone — elevated slopes above timberline characterized by low, shrubby, slow-growing woody plants and a ground cover of boreal lichens, sedges, and grasses.

- *Wetland/Deep Water*: In general, wetlands are lands where saturation with water largely determines the nature of soil development and the types of plant and animal communities living in the soil and on its surface. The dominant plants are hydrophytes. The single feature that most wetlands share is soil or substrate that is at least periodically saturated or covered by water.

Wetlands are transitional sites between terrestrial and aquatic systems where the water table is usually at or near the surface, or where the land is covered by shallow water.

Deepwater habitats are permanently flooded lands lying below the deepwater boundary of wetlands. Deepwater habitats include environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live, whether or not they are attached to the substrate. As in wetlands, the dominant plants are hydrophytes; however, the water is generally too deep to support emergent vegetation.

Palustrine – non-tidal wetlands dominated by emergent mosses, lichens, persistent emergents, shrubs, or trees (Cowardin et al. 1979).

Sedge meadow — dominated by sedges (*Carex*), cattails (*Typha*) etc.; surface water depths to 6 inches (15 cm) in winter and early spring; soil surface exposed but saturated in summer

Shallow marsh — characterized by persistent emergent vegetation and water depths to 1.5 feet (0.5 m)

Deep marsh — characterized by emergent and floating-leaved plants and water depths to 6 feet (2 m)

Shrub swamp — dominated by woody vegetation less than 20 feet (6 m) tall, soil seasonally or permanently flooded to a depth of 1 foot (30 cm)

Bog — characterized by peat accumulation due to cold, acidic conditions; (usually) a floating mat of vegetation; generally sundew (*Drosera*) and pitcher plant (*Sarracenia*) are common.

Pond — permanent palustrine water body, characterized by emergent and/or floating-leaved plants, up to 20 acres (8 ha) in size

Lacustrine — deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30 percent areal coverage; and (3) total area exceeds 4 ha (10 acres)

Lake — characterized by water depth of 6.5 feet (2 m)

Riverine — wetlands and deepwater habitats contained within a channel through which the water flows

Stream — intermittent or permanent up to 30 cubic feet (0.0283 m^3) per second, at high flow

River — at least 30 cubic feet (0.0283 m^3) per second at low flow

Riparian Zone — stream and river banks and associated vegetation

Estuarine — deepwater tidal habitats and adjacent tidal wetlands that are usually semienclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land.

Marine habitats

Coastal beaches and rocks

Bay, ocean

- *Other*:

Stable banks - excavated sand or gravel banks or naturally cut stream banks topped by an overhanging grassy top

Ledge, cliff

Cave

Structure, building

Derelict building, debris — abandoned building, etc.

Species Activities/Season of Occurrence

Habitat utilization by species is rated separately for life history activities and seasons as follows for birds and mammals:

B — Breeding season (for mammals, refers to the period when young are born and being nurtured).

BF — Breeding season, feeding

W — Winter

WF — Winter feeding

For amphibians and reptiles, habitat use is shown for breeding (B) and nonbreeding (NB) seasons only, because, with few exceptions, they are inactive during winter, and overwinter underground or in bottom sediments, etc.

Consult the species accounts for the time periods of these activities.

Habitat Suitability

The suitability (quality) of each community type for a given species was based on ratings by the experts acknowledged, and on our field experience. Although they are subjective, they represent the best estimates currently available. On the matrix, the light shading indicates utilized habitat, and the dark shading with bullet indicates preferred habitat.

Species Accounts/Distribution Maps

Life history details are summarized in accounts for each species. We assembled this information from the available literature, expert reviews, and continuing field research. Distribution maps for each species have been compiled from numerous sources. Approximate continuous range in New England is shown and may include areas where a species has not been found, but is presumed to occur where its required habitat components are present.

Life history information is arranged as follows: Range, Relative Abundance in New England, Habitat, Special Habitat Requirements, Reproductive Habits (inclusions vary with classes of vertebrates), Territory/Home Range, Sample Densities, Foraging Habits, Economic Status, Comments, and Key References.

The range description includes the animal's distribution throughout the United States and Canada.

The relative abundance indicated in each species account is an approximation of the species occurrence in New England. Included in the habitat section are details of the requirements for breeding or hibernation, where applicable. If specific habitat components are required by a species for its regular occurrence, these are listed under special habitat requirements. Reproductive, home range, sample densities, and foraging information was taken from studies conducted in New England when such references were available. Where information from states outside the region is included, the locality of the research is noted in the text. The comments section includes additional information to acquaint the user with each species.

Frequently, life history information was unavailable; further research is needed to fill these gaps. Key references are key life history references among those that we consulted; they are the most complete general references available, but not necessarily the most recent.

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USING THE PUBLICATION

The compilation of natural history and habitat information for the inland (nonmarine) wildlife of New England can aid foresters and forest wildlife biologists in assessing the potential effects of proposed habitat management practices on wildlife species. It would also aid land managers in developing and evaluating resource management planning alternatives. All inland species are presented in terms of practical habitat classification schemes for forested and nonforested habitats, so that management objectives can be set and evaluated and costs assessed.

Application of Information

The information can be used for considering the potential responses of amphibians, reptiles, birds, and mammals to habitat alterations through forest management in New England. We stress the word *potential*. There is no substitute for sound field work and judgment in assessing the impacts of a specific project or proposed management action. From a research standpoint, the habitat associations provided here are essentially a set of hypotheses that can and should be tested further. The information in this publication is most useful for land management and project planning; the larger the unit considered, the more accurately the species occurrence can be predicted. Large areas will likely contain more of the special habitat requirements, more edges due to the interspersion of habitats, and more successional stages, hence more species. Conversely, the smaller (more site-specific) an area, the less accurate will be assumptions or predictions of species occurrence, and the greater the need for biological experience and detailed field work.

Users of this publication are urged to identify the species applicable to their area of interest or responsibility. These species can be checked in the local occurrence column on the matrix.

If questions on individual species remain unanswered, consult the references in the species accounts.

A list of species potentially affected by a given project can be prepared by looking down the columns of habitat descriptions under consideration, and, at each entry encountered, checking to see whether that species has a special habitat requirement listed. If so, and if the proposed project site does not contain that requirement, the species likely will not occur there. This two-stage elimination of species not occurring in the project area and of species whose special needs do not occur on the site, will facilitate the development of a list of species inhabiting the site. Such a process implies familiarity with the site — it should be visited, and its features — streams, marshes, snags, and so on — noted before a list of species is prepared.

Last, each species response to the proposed alternative can be identified by noting whether it will be positively or negatively affected by a project. If the nature of the resulting change in vegetation is known, examination of the size class or successional entries in a given forest type will at least reveal those species that are associated with earlier or later stages. If the direction of habitat alteration is known, a good judgment can be made on the likely effects on wildlife species.

Obviously, if threatened or endangered species are likely to be affected by a project, consultation with the Regional Endangered Species Coordinator, Fish and Wildlife Service, U.S. Department of Interior, is required.

Accuracy of Information

This publication must be considered the beginning effort to assemble the natural history and habitat associations to enable sound management of New England wildlife. The data base needs to be expanded to other nonforested habitats, and entries need to be field checked to improve accuracy. The limitations of the information point up some cautions:

- This publication is not a substitute for professional field work, nor for thoroughly checking each site proposed for management. At the very least, managers need field information on the special habitat requirements present or lacking on each site proposed for management.

- This publication lists the species potentially occurring in a given habitat. More are listed than will likely occur — the smaller the site, the fewer the actual species that will occur of those potentially able to occur. Factors other than habitat features affect a given species occurrence on a given area. This effect diminishes with increasing area of consideration. Still, several site visits will be required to determine whether a given species actually occurs on a given site.

- No information is included on habitat size. The best clue to help determine whether a given species will occur, after checking whether its special habitat requirements are present, is to compare its territory or home-range size with that of the proposed project. No detailed information, therefore, is provided here on how many of a given species will occur on a given area. Merely dividing the project area by the territory/home range area of a species is not recommended, because not all parts of a habitat patch will be occupied, and density will be overestimated. For an elaboration on these cautionary notes, see Verner and Boss (1980). We have provided sample densities when such information was reported. Note localities when consulting these entries.

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AMPHIBIANS AND REPTILES

This section provides a compilation of natural histories, distributions, and habitat associations for the 26 amphibians and 30 reptiles occurring in New England. The distributions of several species are not well known in New England—maps need to be up-dated periodically. Nomenclature follows that of Collins and others (1982): *Standard Common and Current Scientific Names for North American Amphibians and Reptiles*.

We have included the mudpuppy *(Necturus m. maculosus)* and red-eared slider *(Pseudemys scripta elegans)*, introduced species that have established populations in parts of the region. We have omitted the eastern mud turtle *(Kinosternon s. subrubrum)* because Connecticut individuals are believed to have been released and no breeding populations are known to exist. We have also omitted the rough green snake *(Opheodrys aestivus)*—although two records exist for Connecticut, no breeding populations are known.

Species are listed in phylogenetic order. Measurement units here are as reported in the original work. When the original work used English units, metric equivalents have been supplied. Variations in development and hatching times for a species may be attributed to genetic and environmental factors. Although key references are given for each species, the species accounts point up many gaps in our knowledge of amphibians and reptiles.

Species and Subspecies

- Caudata
  - Necturidae
    - Mudpuppy (*Necturus m. maculosus*) 39
  - Ambystomatidae
    - Marbled Salamander (*Ambystoma opacum*) 40
    - Jefferson Salamander (*Ambystoma jeffersonianum*) 41
    - Silvery Salamander (*Ambystoma platineum*) ... 43
    - Blue-spotted Salamander (*Ambystoma laterale*) 44
    - Tremblay's Salamander (*Ambystoma tremblayi*) 45
    - Spotted Salamander (*Ambystoma maculatum*) 46
  - Salamandridae
    - Red-spotted Newt (*Notophthalmus v. viridescens*) 48
  - Plethodontidae
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    - Slimy Salamander (*Plethodon g. glutinosus*) ... 55
    - Four-toed Salamander (*Hemidactylium scutatum*) 56
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- Anura
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    - Eastern Spadefoot (*Scaphiopus h. holbrookii*) .. 59
  - Bufonidae
    - Eastern American Toad (*Bufo a. americanus*) .. 60
    - Fowler's Toad (*Bufo woodhousii fowleri*) 61
  - Hylidae
    - Northern Spring Peeper (*Hyla c. crucifer*) 62
    - Gray Treefrog (*Hyla versicolor*) 63
  - Ranidae
    - Bullfrog (*Rana catesbeiana*) 64
    - Green Frog (*Rana clamitans melanota*) 65
    - Mink Frog (*Rana septentrionalis*) 66
    - Wood Frog (*Rana sylvatica*) 67
    - Northern Leopard Frog (*Rana pipiens*) 68
    - Pickerel Frog (*Rana palustris*) 69
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  - Chelydridae
    - Common Snapping Turtle (*Chelydra s. serpentina*) 70
  - Kinosternidae
    - Stinkpot (*Sternotherus odoratus*) 71
  - Emydidae
    - Spotted Turtle (*Clemmys guttata*) 72
    - Bog Turtle (*Clemmys muhlenbergii*) 73
    - Wood Turtle (*Clemmys insculpta*) 75
    - Eastern Box Turtle (*Terrapene c. carolina*) 77
    - Map Turtle (*Graptemys geographica*) 78
    - Red-eared Slider (*Pseudemys scripta elegans*) 79
    - Plymouth Redbelly Turtle (*Pseudemys rubriventris bangsi*) 80
    - Eastern Painted Turtle (*Chrysemys p. picta*) 81
    - Midland Painted Turtle (*Chrysemys picta marginata*) 82
    - Blanding's Turtle (*Emydoidea blandingii*) 83
  - Trionychidae
    - Eastern Spiny Softshell (*Trionyx s. spiniferus*) 84
- Squamata
  - Lacertilia
    - Scincidae
      - Five-lined Skink (*Eumeces fasciatus*) 85
  - Serpentes
    - Colubridae
      - Northern Water Snake (*Nerodia s. sipedon*) 86
      - Northern Brown Snake (*Storeria d. dekayi*) 87
      - Northern Redbelly Snake (*Storeria o. occipitomaculata*) 88
      - Eastern Garter Snake (*Thamnophis s. sirtalis*) .. 89
      - Maritime Garter Snake (*Thamnophis sirtalis pallidula*) 90
      - Eastern Ribbon Snake (*Thamnophis s. sauritus*) 91
      - Northern Ribbon Snake (*Thamnophis sauritus septentrionalis*) 92
      - Eastern Hognose Snake (*Heterodon platyrhinos*) 93
      - Northern Ringneck Snake (*Diadophis punctatus edwardsi*) 94
      - Eastern Worm Snake (*Carphophis a. amoenus*) 95
      - Northern Black Racer (*Coluber c. constrictor*) .. 96
      - Eastern Smooth Green Snake (*Opheodrys v. vernalis*) 97
      - Black Rat Snake (*Elaphe o. obsoleta*) 98
      - Eastern Milk Snake (*Lampropeltis t. triangulum*) 99
    - Viperidae
      - Northern Copperhead (*Agkistrodon contortrix mokeson*). 100
      - Timber Rattlesnake (*Crotalus horridus*) . . . 101

SPECIES OCCURRENCE AND UTILIZATION, BY HABITAT
FORESTED

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine— Northern red oak— Red maple				Balsam fir				Eastern white pine				Red spruce - Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Marbled Salamander *Ambystoma opacum*	Woodland ponds or swamps for breeding	B															●	●	●																												
			W																																													
	Jefferson Salamander *Ambystoma jeffersonianum*	Temporary pools for breeding	B															●	●	●																												
			W																																													
	Silvery Salamander *Ambystoma platineum*	Temporary pools for breeding	B																																													
			W																																													
	Blue-spotted Salamander *Ambystoma laterale*	Ponds or semi-permanent water for breeding	B																																													
			W																																													
	Tremblay's Salamander *Ambystoma tremblayi*	Woodland ponds for breeding	B																																													
			W																																													
	Spotted Salamander *Ambystoma maculatum*	Mesic woods, semi-permanent water (pH 7-9) for breeding	B															●	●	●																												
			W																																													
	Red-spotted Newt *Notophthalmus v. viridescens*	Water with aquatic vegetation for adult newt	B																																													
			W																																													
	Northern Dusky Salamander *Desmognathus f. fuscus*	Permanent woodland streams or seeps	B																																													
			W																																													
	Mountain Dusky Salamander *Desmognathus ochrophaeus*	Woodland seeps, springs or streams	B															●	●	●																												
			W																																													
	Redback Salamander *Plethodon cinereus*	Logs, stumps, rocks, etc.	B																																													
			W																																													
	Slimy Salamander *Plethodon g. glutinosus*	Rock outcroppings, logs within wooded areas	B															●	●	●																												
			W																																													

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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Four-toed Salamander *Hemidactylium scutatum*	Wet woodlands	B													●	●	●	●																												
			W																																												
	Northern Spring Salamander *Gyrinophilus p. porphyriticus*	Streams, seeps or springs	B														●	●	●																												
			W																																												
	Northern Two-lined Salamander *Eurycea b. bislineata*	Streams for breeding	B																																												
			W																																												
	Eastern Spadefoot *Scaphiopus h. holbrookii*	Sandy soils, temporary pools for breeding	B																																												
			W																																												
	Eastern American Toad *Bufo a. americanus*		B																																												
			W																																												
	Fowler's Toad *Bufo woodhousii fowleri*	Sandy soils, shallow water for breeding	B																																												
			W																																												
	Northern Spring Peeper *Hyla c. crucifer*	Pools for breeding	B																																												
			W																																												
	Gray Treefrog *Hyla versicolor*	Seeps, aquatic sites for breeding	B																																												
			W																																												
	Bullfog *Rana catesbeiana*	Deep permanent water with floating and emergent vegetation	B																																												
			W																																												
	Green Frog *Rana clamitans melanota*	Riparian habitat	B																																												
			W																																												
	Mink Frog *Rana septentrionalis*	**Permanent ponds with lily pads**	B																																												
			W																																												

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Wood Frog *Rana sylvatica*	Vernal woodland pools, backwaters of slow-moving streams	B																																													
			W																																													
	Northern Leopard Frog *Rana pipiens*	Wet meadows	B																																													
			W																																													
	Pickerel Frog *Rana palustris*	Shallow, clear water of bogs or woodland streams	B																																													
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Local occurrence	SPECIES	Special habitat needs
	Common Snapping Turtle *Chelydra s. serpentina*	Aquatic habitat, sandy or gravelly soil or banks
	Bog Turtle *Clemmys muhlenbergii*	Wet meadow in full sun
	Wood Turtle *Clemmys insculpta*	Wooded river or stream banks
	Eastern Box Turtle ***Terrapene c. carolina***	Old fields, clearings, ecotones with sandy soils
	Eastern Painted Turtle *Chrysemys p. picta*	Ponds with projecting or floating logs
	Five-lined Skink *Eumeces fasciatus*	Open woods with logs and slash piles
	Northern Water Snake *Nerodia s. sipedon*	Branches, logs overhanging water, or boulders of dams and causeways in reservoirs
	Northern Brown Snake *Storeria d. dekayi*	
	Northern Redbelly Snake *Storeria o. occipitomaculata*	
	Eastern Garter Snake *Thamnophis s. sirtalis*	
	Eastern Ribbon Snake ***Thamnophis s. sauritus***	Mesic woodlands with aquatic habitat

SPECIES	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak			
		S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L
Common Snapping Turtle	B																					
	W																					
Bog Turtle	B																					
	W																					
Wood Turtle	B																					
	W																					
Eastern Box Turtle	B																			●	●	●
	W																					
Eastern Painted Turtle	B																					
	W																					
Five-lined Skink	B															●	●	●				
	W																					
Northern Water Snake	B																					
	W																					
Northern Brown Snake	B																					
	W																					
Northern Redbelly Snake	B		●	●	●							●	●	●								
	W																					
Eastern Garter Snake	B																					
	W																					
Eastern Ribbon Snake	B														●	●	●	●				
	W																					

SPECIES	Seasonal use	White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce - Balsam fir				Red spruce				Eastern hemlock			
		S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
Common Snapping Turtle	B																								
	W																								
Bog Turtle	B																								
	W																								
Wood Turtle	B																								
	W																								
Eastern Box Turtle	B	●	●	●	●																				
	W																								
Eastern Painted Turtle	B																								
	W																								
Five-lined Skink	B																								
	W																								
Northern Water Snake	B																								
	W																								
Northern Brown Snake	B																								
	W																								
Northern Redbelly Snake	B		●	●	●						●	●	●										●	●	●
	W																								
Eastern Garter Snake	B																								
	W																								
Eastern Ribbon Snake	B																								
	W																								

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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce - Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Eastern Hognose Snake *Heterodon platyrhinos*	Sandy soils, open woodlands	B																							●	●	●																				
			W																																													
	Northern Ringneck Snake *Diadophis punctatus edwardsi*	Mesic conditions with abundant cover	B															●	●	●																												
			W																																													
	Eastern Worm Snake *Carphophis a. amoenus*	Loose soils for burrowing or covering	B																							●	●	●																				
			W																																													
	Northern Black Racer *Coluber c. constrictor*		B																						●	●	●	●					●	●	●	●												
			W																																													
	Eastern Smooth Green Snake *Opheodrys v. vernalis*	Upland grassy opening	B																																													
			W																																													
	Black Rat Snake *Elaphe o. obsoleta*		B																						●	●	●	●																				
			W																																													
	Eastern Milk Snake *Lampropeltis t. triangulum*	Slash, woodpiles, debris or loose soil for egg laying	B																																													
			W																																													
	Northern Copperhead *Agkistrodon contortrix mokeson*	Rocky hillsides, talus slopes	B																							●	●	●																				
			W																																													
	Timber Rattlesnake *Crotalus horridus*	Rock ledges on forested hillsides	B																																													
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SPECIES OCCURRENCE AND UTILIZATION, BY HABITAT
NONFORESTED

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Mudpuppy *Necturus m. maculosus*	Flowing water at least 3 feet deep for breeding.	B																●	●	●									
			NB																●	●	●									
	Marbled Salamander *Ambystoma opacum*	Woodland ponds or swamps for breeding.	B																											
			NB																											
	Jefferson Salamander *Ambystoma jeffersonianum*	Temporary pools for breeding.	B															●												
			NB																			●								
	Silvery Salamander *Ambystoma platineum*	Temporary pools for breeding.	B															●												
			NB																											
	Blue-spotted Salamander *Ambystoma laterale*	Ponds or semi-permanent water for breeding.	B															●												
			NB																											
	Tremblay's Salamander *Ambystoma tremblayi*	Woodland ponds for breeding.	B															●												
			NB																											
	Spotted Salamander *Ambystoma maculatum*	Mesic woods, semi-permanent water (pH 7-9) for breeding.	B															●												
			NB																											
	Red-spotted Newt *Notophthalmus v. viridescens*	Water with aquatic vegetation for adult newt.	B													●				●											
			NB																											
	Northern Dusky Salamander *Desmognathus f. fuscus*	Permanent woodland streams or seeps.	B																	●										
			NB																											
	Mountain Dusky Salamander *Desmognathus ochrophaeus*	Woodland seeps, springs or streams.	B																	●		●								
			NB																											
	Redback Salamander *Plethodon cinereus*	Logs, stumps, rocks, etc.	B																											
			NB																											

				Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
Local occurrence	SPECIES	Special habitat needs	Seasonal use	Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Slimy Salamander *Plethodon g. glutinosus*	Rock outcroppings, logs within wooded areas.	B																											
			NB																											
	Four-toed Salamander *Hemidactylium scutatum*	Wet woodlands.	B														●													
			NB														●													
	Northern Spring Salamander *Gyrinophilus p. porphyriticus*	Streams, seeps or springs.	B																	●										
			NB														●													
	Northern Two-lined Salamander *Eurycea b. bislineata*	Streams for breeding.	B																	●		●								
			NB																			●								
	Eastern Spadefoot *Scaphiopus h. holbrookii*	Sandy soils, temporary pools for breeding.	B																											
			NB																											
	Eastern American Toad *Bufo a. americanus*		B																											
			NB																											
	Fowler's Toad *Bufo woodhousii fowleri*	Sandy soils, shallow water for breeding.	B															●	●											
			NB																											
	Northern Spring Peeper *Hyla c. crucifer*	Pools for breeding.	B											●				●												
			NB																											
	Gray Treefrog *Hyla versicolor*	Seeps, aquatic sites for breeding.	B																											
			NB																											
	Bullfrog *Rana catesbeiana*	Deep permanent water with floating and emergent vegetation.	B															●	●											
			NB																											
	Green Frog *Rana clamitans melanota*	Riparian habitat.	B																			●								
			NB																											

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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Mink Frog *Rana septentrionalis*	Permanent ponds with lily pads.	B																●	●										
			NB																											
	Wood Frog *Rana sylvatica*	Vernal woodland pools, backwaters of slow-moving streams.	B																											
			NB																											
	Northern Leopard Frog *Rana pipiens*	Wet meadows.	B										●																	
			NB											●																
	Pickerel Frog *Rana palustris*	Shallow, clear water of bogs or woodland streams.	B														●	●	●											
			NB																											
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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Common Snapping Turtle *Chelydra s. serpentina*	Aquatic habitat, sandy or gravelly soil or banks.	B																											
			NB															●	●											
	Stinkpot *Sternotherus odoratus*	Permanent water bodies, entirely aquatic except when laying eggs.	B																											
			NB															●	●											
	Spotted Turtle *Clemmys guttata*	Unpolluted shallow water.	B					●					●																	
			NB											●	●															
	Bog Turtle *Clemmys muhlenbergii*	Wet meadow in full sun.	B										●				●													
			NB																											
	Wood Turtle *Clemmys insculpta*	Wooded river or stream banks.	B																											
			NB																	●										
	Eastern Box Turtle *Terrapene c. carolina*	Old fields, clearings, ecotones with sandy soils.	B																											
			NB																											
	Map Turtle *Graptemys geographica*	Water bodies with muddy or soft bottom substrate.	B																●		●									
			NB																●		●									
	Red-eared Slider *Psuedemys scripta elegans*	Quiet water with muddy bottom, thick vegetation, projecting log, etc. for basking.	B					●																						
			NB												●			●												
▲	Plymouth Redbelly Turtle *Psuedemys rubriventris bangsi*	Muddy-bottomed shallows, thick aquatic vegetation, esp. milfoil or bladderwort.	B																											
			NB																											
	Eastern Painted Turtle *Chrysemys p. picta*	Ponds with projecting or floating logs.	B																											
			NB												●			●												
	Midland Painted Turtle *Chrysemys picta marginata*	Ponds with projecting or floating logs.	B																			●								
			NB																											

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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Blanding's Turtle *Emydoidea blandingii*	Shallow water.	B																			●								
			NB																											
	Eastern Spiny Softshell *Trionyx s. spiniferus*	Shallow water, muddy bottom, aquatic vegetation.	B																			●								
			NB																											
	Five-lined Skink *Eumeces fasciatus*	Open woods with logs and slash piles.	B																											
			NB																											
	Northern Water Snake *Nerodia s. sipedon*	Branches, logs overhanging water, or boulders of dams and causeways in reservoirs	B																											
			NB																											
	Northern Brown Snake *Storeria d. dekayi*		B																											●
			NB																											●
	Northern Redbelly Snake *Storeria o. occipitomaculata*		B																											
			NB																											
	Eastern Garter Snake *Thamnophis s. sirtalis*		B																											
			NB																											
	Maritime Garter Snake Thamnophis sirtalis pallidula		B																											
			NB																											
	Eastern Ribbon Snake *Thamnophis s. sauritus*	Mesic woodlands with aquatic habitat.	B										●							●		●								
			NB																											
	Northern Ribbon Snake *Thamnophis sauritus septentrionalis*	Shallow, permanent water in open, grassy habitat.	B																											
			NB																											
	Eastern Hognose Snake *Heterodon platyrhinos*	Sandy soils, open woodlands.	B					●																						
			NB	●																										

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field					Savanna	Orchard	Krummholz	Alpine	Palustrine						Lake	Riverine			Estuary/salt marsh	Marine		Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
				Cultivated	Grass	Forb	Shrub/old field	Pasture					Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond		Stream	River	Riparian		Coastal beach/rocks	Bay, ocean					
	Northern Ringneck Snake *Diadophis punctatus edwardsi*	Mesic areas with abundant cover.	B																											
			NB																											
	Eastern Worm Snake *Carphophis a. amoenus*	Loose soils for burrowing or covering.	B																			●								
			NB																											
	Northern Black Racer *Coluber c. constrictor*		B		●																									
			NB																											
	Eastern Smooth Green Snake *Opheodrys v. vernalis*	Upland grassy opening.	B		●			●																						
			NB																											
	Black Rat Snake *Elaphe o. obsoleta*		B				●																							●
			NB																											
	Eastern Milk Snake *Lampropeltis t. triangulum*	Slash, woodpiles, debris or loose soil for egg laying.	B																										●	●
			NB																										●	●
	Northern Copperhead *Agkistrodon contortrix mokeson*	Rocky hillsides, talus slopes.	B																								●			
			NB																								●			
	Timber Rattlesnake *Crotalus horridus*	Rock ledges on forested hillsides.	B																								●			
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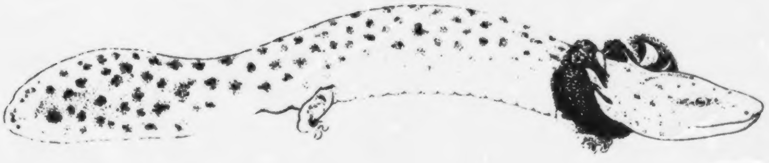
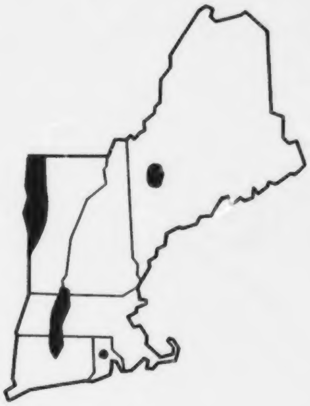
Mudpuppy

(Necturus m. maculosus)





RANGE: St. Lawrence River w. to se. Manitoba, s. to e. Kansas and n. Alabama and through c. Pennsylvania to New York and the Champlain Valley. Absent from the Adirondacks. Introduced in parts of New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Entirely aquatic. Clear or muddy waters of lakes, rivers, ditches, and large streams. One individual found at 90 feet (27.4 m) in Lake Michigan (Behler and King 1979:283). Often found in submerged log piles around the bases of bridge pilings in larger rivers and around obstructions in streams (Shoop and Gunning 1967).

SPECIAL HABITAT REQUIREMENTS: Moving water.

AGE/SIZE AT SEXUAL MATURITY: At 5 years and at 8 inches (20.3 cm) total length (Bishop 1947:43). Retains external gills as an adult.

BREEDING PERIOD: Autumn (Bishop 1947:42).

EGG DEPOSITION: May and June of the year following mating. Reproduces in flowing water (Oliver 1955:211). Prefers water depths of at least 3 feet (0.9 m) and bottoms with weeds and rocks to provide nesting cover. Nest sites are often under large rock slabs in water depths of 6 to 8 inches (15 to 20 cm) in New York (Stewart 1961:68).

NO. EGGS/MASS: 18 to 180 eggs (average 60 to 100) in water beneath objects, attached singly by stalks (Bishop 1941:26).

TIME TO HATCHING: 38 to 63 days, female guards eggs (Bishop 1941:27).

HOME RANGE/MOVEMENT: Displacement of individuals in Louisiana suggests homing ability; occupy restricted areas throughout the year (Shoop and Gunning 1967).

FOOD HABITS/PREFERENCES: In New York, aquatic insects were 30 percent of the diet by weight, particularly nymphs and larval forms, crustaceans 33 percent, small fish 13 percent, also mollusks, spawn, other amphibians, worms, leeches, and plants (Hamilton 1932). Most food captured at night along the bottom.

COMMENTS: The mudpuppy is chiefly nocturnal, bottom dwelling, and active through the winter, when it moves to deeper water. This species was first found in the Connecticut River in Massachusetts in 1931 where laboratory specimens had been released from Amherst College (Warfel 1936). The Maine population also originated from released individuals; however, the Rhode Island population origin is unknown but is presumed to be introduced (Vinegar and Friedman 1967).

KEY REFERENCES: Bishop 1947, Logier 1952.

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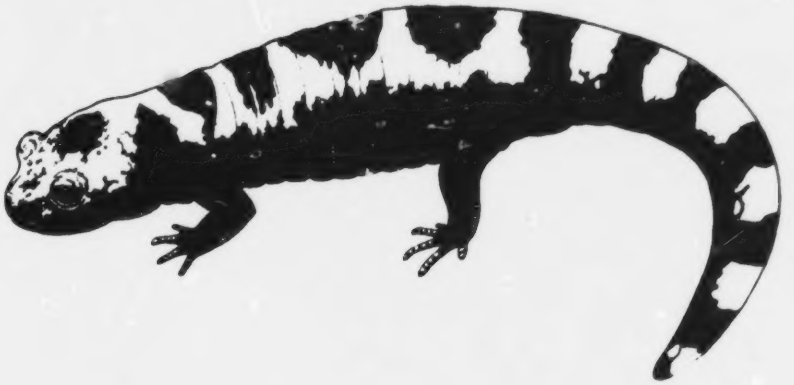
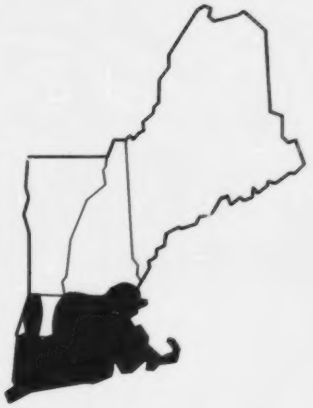
Marbled Salamander

(Ambystoma opacum)





RANGE: New Hampshire and c. Massachusetts, c. Pennsylvania to s. Illinois, s. Missouri to e. Texas. Throughout the Eastern United States except s. Louisiana and Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Sandy and gravelly areas of mixed deciduous woodlands, especially oak-maple and oak-hickory (Minton 1972:46), trap rock slopes (M. Klemens, personal communication). During breeding season, found in low areas around ponds, swamps, and quiet streams. Inhabits somewhat drier areas than other species of Ambystoma. During the summer usually found under logs and rocks. Found at 900 feet (274 m) above sea level in Connecticut (Babbitt 1937). Larvae usually found in temporary water throughout the winter. Probably hibernates in deep burrows.

SPECIAL HABITAT REQUIREMENTS: Ponds or swamps in wooded areas for breeding.

AGE/SIZE AT SEXUAL MATURITY: 15 to 18 months.

BREEDING PERIOD: During the fall, adults migrate to breeding areas (September in northern parts of range).

EGG DEPOSITION: September to early October in nothern parts of range (Bishop 1941:138). Temperature taken at the nest sites in both New Jersey and South Carolina ranged from 11-15°C (52-59°F), (Anderson and Williamson 1973).

NO. EGGS/MASS: 50 to 232 (average 100) eggs laid singly in shallow depressions beneath surface materials (Bishop 1941:142). Eggs laid in dry beds of temporary ponds and streams or on land, or at the edge of ponds or swamps, where they will be washed into the water to hatch.

TIME TO HATCHING: 15 to 207 days; female forms a nest site and may brood eggs (Oliver 1955:234).

EGGS HATCH: Usually in fall or early winter when submerged but without rain will hatch in spring. Anderson (1972) found a wide range of temperature tolerance — 3-14°C (37 — 75°F) — for egg development.

LARVAL PERIOD: Larvae overwinter with little growth until spring, and transform to terrestrial form in late May to June (Noble and Brady 1933). A higher temperature and abundant food supply will hasten metamorphosis (Stewart 1956b). The larval period was 135 days in New Jersey (Hassinger et al. 1970).

HOME RANGE/MOVEMENT: Adults migrate an average of 194 m from breeding sites to summer range in Indiana (Williams 1973, cited in Semlitsch 1980b:320).

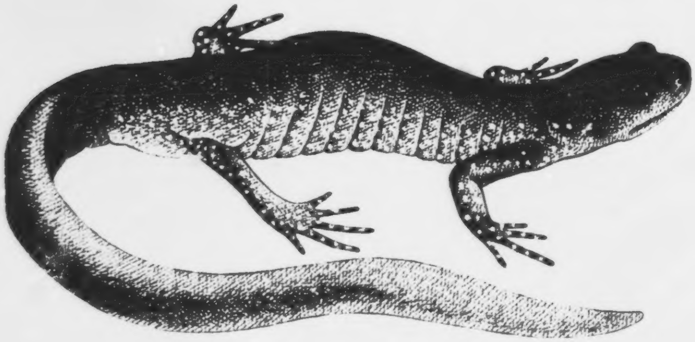
FOOD HABITS/PREFERENCES: Arthopods, including adults and larval insects and crustaceans. Also takes earthworms and mollusks. Marbled salamander larvae eat small aquatic insects, crustaceans, and other small invertebrates and are cannibalistic (Minton 1972:47). Larvae rise in the water column to feed (T. Tyning, personal communication).

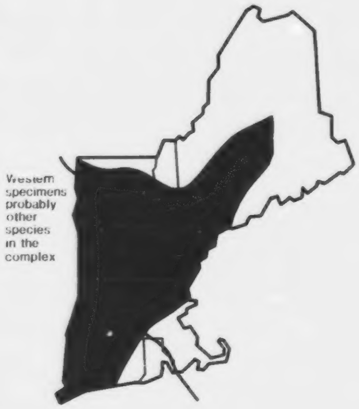
COMMENTS: Terrestrial and nocturnal, often using runways of other animals or tunnels through loose soil. Young larvae are aquatic and primarily nocturnal.

KEY REFERENCES: Anderson 1967b, Hassinger et al. 1970, Lazell 1979.

Jefferson Salamander

(Ambystoma jeffersonianum)





NOTE: See COMMENTS section.

RANGE: Western New England to wc. Indiana, c. Kentucky to w. Virginia and n. to n. New Jersey.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to rare.

HABITAT: Terrestrial, found in undisturbed damp, shady deciduous or mixed woods, bottomlands, swamps, ravines, moist pastures, or lakeshores. Hides beneath leaf litter, under stones or in decomposing logs and stumps. Cleared strips create a barrier for dispersal (Pough and Wilson 1976). Upland hardwood forests on glaciated limestone areas northwest of the Great Swamp in New Jersey (Anderson and Giacosie 1967). In Connecticut, members of the *Ambystoma jeffersonianum* complex are more abundant and widespread in upland areas of the Connecticut River Valley (M. Klemens, personal communication) and documented within shale ravines in Connecticut (Babbitt 1937). Hibernates on land in winter months, usually near breeding waters. Have been found within rotten logs (Blanchard 1933b).

SPECIAL HABITAT REQUIREMENTS: Requires temporary ponds for breeding period. Egg mortality exceeded 60 percent in pools more acid than pH 5 in Tompkin's County, New York (Pough 1976).

AGE/SIZE AT SEXUAL MATURITY: Females at 21 months (Bishop 1941:102), snout to vent length 70 to 75 mm in males, 75 to 80 mm in females (Minton 1954). Juveniles probably enter the breeding population at 2 to 3 years of age (Wilson 1976, cited in Thompson et al. 1980:119).

BREEDING PERIOD: February to April, migrates to ponds and vernal pools for spawning (Brandon 1961). Breeds earlier than *A. maculatum* in central Pennsylvania (Gatz 1971).

EGG DEPOSITION: February to April, often beneath ice. Will tolerate pH of 4 to 8, with best hatching success at 5 to 6 pH range (Pough and Wilson 1976). Isolated upland pools bordered by shrubs and surrounded by forest were primary breeding sites in Maryland (Thompson et al. 1980).

NO. EGGS/MASS: 107 to 286 eggs (Oliver 1955:234). Many variations of egg deposition, laid singly or in small cylindrical masses of 1 to 35 eggs each, in water attached to twigs or plants or under rocks. Egg masses average 16 eggs per mass (Bishop 1941:94).

TIME TO HATCHING: 13 to 45 days (Bishop 1947:135, Oliver 1955:234).

LARVAL PERIOD: 56 to 125 days (Bishop 1941:99). Found overwintering in Nova Scotia (Bleakney 1952).

HOME RANGE/MOVEMENT: Adults migrated an average of 252 m from breeding ponds to summer range in Indiana. Newly metamorphosized individuals moved an average 92 m from the ponds (Williams 1973, cited in Semlitsch 1980b:320). In hardwood forest of northern Kentucky, adults moved an average of 250 m from ponds in a series of 6 to 8 moves in 45 days (Douglas and Monroe 1981).

FOOD HABITS/PREFERENCES: Small invertebrates, including worms, millipedes, spiders, insects, and aquatic crustaceans. Feeds on most animal life that it can capture.

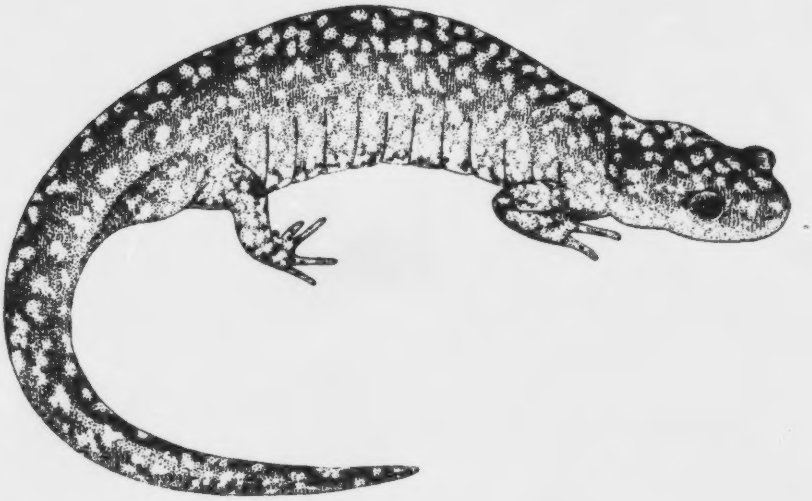
COMMENTS: Before 1964, almost all references to specimens in the *Ambystoma jeffersonianum* complex (including *A. jeffersonianum, A. laterale, A. tremblayi,* and *A. platineum*) were reported as *A. jeffersonianum* (Uzzell 1964). Many papers have since dealt with the genetics and taxonomy of this complex. This ongoing taxonomic revision has resulted in many apparently erroneous locality records. *Ambystoma jeffersonianum* is currently believed not to occur east of the Connecticut River Valley (at least in central and northern New Hampshire), and all museum specimens from this area identified as *A. jeffersonianum* have been found to refer to the diploid blue-spotted salamander (*A. laterale*) or the triploid Tremblay's salamander (*A. tremblayi*) (Thomas French, personal communication).

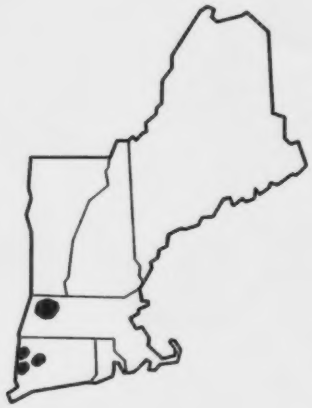
The Jefferson salamander may occur throughout the Connecticut River Valley in southwestern New Hampshire. The only one verified record in New Hampshire is Winchester, Cheshire County, in May 1984 (NHNHI unpublished data).

KEY REFERENCES: Anderson and Giacosie 1967, Logier 1952, Pough and Wilson 1976, Uzzell 1967a.

Silvery Salamander

(Ambystoma platineum)





RANGE: Occurs with *A. jeffersonianum;* however, range is mainly restricted to areas north of the Wisconsin glacial moraine where ranges of *A. jeffersonianum* and *A. laterale* meet or overlap. Central Indiana e. to n. New Jersey and w. Massachusetts.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Found with *A. jeffersonianum* in upland hardwood forests in Sussex County, New Jersey (Anderson and Giacosie 1967).

SPECIAL HABITAT REQUIREMENTS: See *A. jeffersonianum.*

AGE/SIZE AT SEXUAL MATURITY: Unreported.

BREEDING PERIOD: March to April (Behler and King 1979:296).

EGG DEPOSITION: Unreported.

NO. EGGS/MASS: Typically 15 to 20 eggs per mass, in cylindrical masses attached to submerged twigs and grass stems. Rarely if ever attached to pond bottom debris (Uzzell 1967c:49.1).

HOME RANGE/MOVEMENT: Unreported.

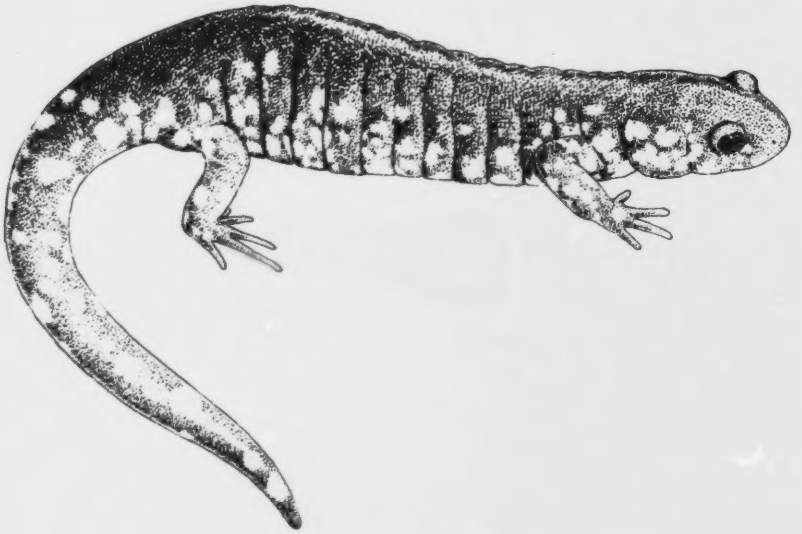
FOOD HABITS/PREFERENCES: Unreported.

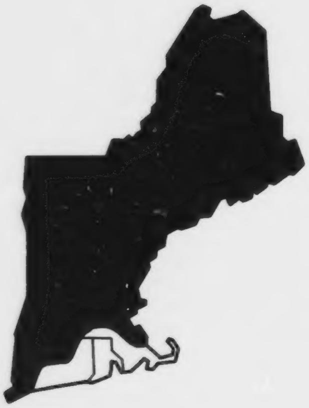
COMMENTS: A hybrid of Jefferson and blue-spotted salamanders with three sets of chromosomes (two sets from Jefferson and one from blue-spotted). Most are female, only one male has been recorded (Smith 1978:88). Genetic material is not contributed by male Jefferson; the sperm only stimulates egg production (Uzzell 1964). *A jeffersonianum* and *A. laterale* probably developed from a common ancestor that was reproductively isolated by the Wisconsin glaciation. As the glacier retreated and the two species mixed, hybridization occurred (Uzzell 1964). All four species of the complex have been found to occur sympatrically in a few areas: *A. laterale* and *A. tremblayi* are generally more northern; *A. jeffersonianum* and *A. platineum* are generally more southern in the range of the complex (Austin and Bogart 1982).

KEY REFERENCES: Smith 1978; Uzzell 1964, 1967.

Blue-spotted Salamander

(Ambystoma laterale)





NOTE: See COMMENTS section for Jefferson salamander.

RANGE: Southeastern Quebec and the n. shore of the Gulf of St. Lawrence to James Bay and the s. end of Lake Winnipeg, s. to n. Illinois and Indiana, n. New York and New England. Disjunct colonies in New Jersey, Long Island, Iowa, and Labrador.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare; threatened in southern portion of range.

HABITAT: Wooded, swampy or moist areas (Minton 1954). Occasionally in overgrown pastures. Sometimes occurs where soil is sandy, and may be found under logs or other forest debris (in hardwood forests in the remnants of glacial Lake Passaic in New Jersey) (Anderson and Giacosie 1967). Occurs in a wide range of elevations (in western Connecticut) and along the Connecticut River floodplain (M. Klemens, personal communication).

SPECIAL HABITAT REQUIREMENTS: Ponds or semi-permanent water for breeding.

AGE/SIZE AT SEXUAL MATURITY: Snout to vent length of 47 to 55 mm in Indiana (Minton 1954).

BREEDING PERIOD: During early spring rains when night temperatures are above freezing (Lazell 1968).

EGG DEPOSITION: March to early April. Eggs laid on the bottoms of temporary shallow forest ponds, roadside drainage ditches, temporary pasture ponds, kettle holes (Landre 1980), attached to litter or in bottom detritus (Stille 1954), and twigs (Uzzell 1976b:48.1).

NO. EGGS/MASS: Varies greatly: 199 to 247 eggs (Uzzell 1964); 82 to 489 (Minton 1972:36); 6 to 10 eggs per mass (Landre 1980); often laid singly (Uzzell 1967b).

TIME TO HATCHING: About 1 month (Smith 1961:28).

LARVAL PERIOD: Extending to late June or mid-August (Smith 1961:28).

HOME RANGE/MOVEMENT: Unreported.

FOOD HABITS/PREFERENCES: Arthropods, annelids, and centipedes.

COMMENTS: Acid precipitation and habitat loss are major threats to this species in the Northeast.

KEY REFERENCES: Anderson and Giacosie 1967; Bleakney 1957; Landre 1980; Uzzell 1964, 1967b.

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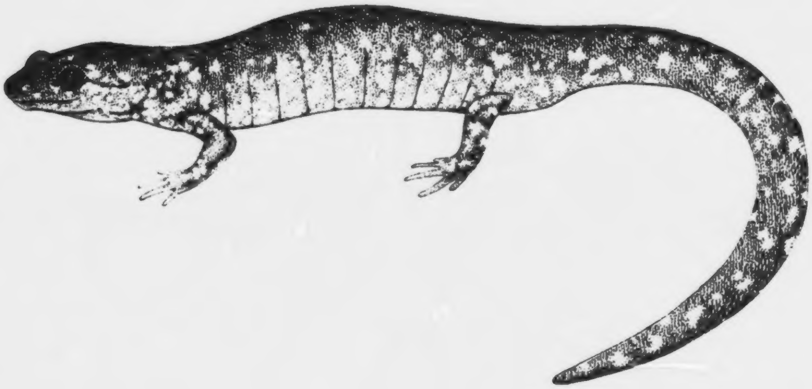
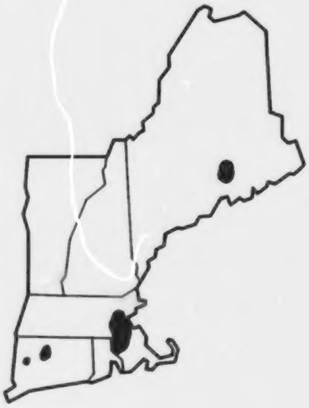
Tremblay's Salamander

(Ambystoma tremblayi)





NOTE: See COMMENTS section for Jefferson salamander.

RANGE: Disjunct colonies in New Brunswick, Ottawa River drainage, e. Massachusetts, New Jersey, nw. Ohio, Indiana and Michigan, and n. Wisconsin. (Connecticut record dependent on interpretation of electrophoretic data.)

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare

HABITAT: Deciduous forests surrounding small ponds or lakes (Minton 1972:37). Have been found under logs.

SPECIAL HABITAT REQUIREMENTS: Woodland ponds for breeding.

AGE/SIZE AT SEXUAL MATURITY: Unreported.

BREEDING PERIOD: March in Indiana (Minton 1972:38).

EGG DEPOSITION: April (Uzzell 1964).

NO. EGGS/MASS: 135 to 162 eggs (Uzzell 1964), laid in groups of two, three, or four, sometimes singly, in small clusters at pond bottoms or attached to submerged sticks (Uzzell 1967a:50.1).

LARVAL PERIOD: Transform in 95 to 101 days (Uzzell 1964). Larval period shortens as eggs are deposited later in the spring.

TIME TO HATCHING: Unreported.

HOME RANGE/MOVEMENT: Unreported.

FOOD HABITS/PREFERENCES: Thought to be similar to *A. laterale*.

COMMENTS: Triploid of hybrid origin from *A. laterale* and *A. jeffersonianum*, similar to *A. laterale,* from which it receives two sets of chromosomes, one set from *A. jeffersonianum*. Female population only (gynogenetic reproduction) depends on males of *A. laterale* to stimulate egg development (Uzzell 1964). The spermatophore of *A. laterale* is picked up, but the sperm does not penetrate the egg.

KEY REFERENCES: Minton 1972; Uzzell 1964, 1967a.

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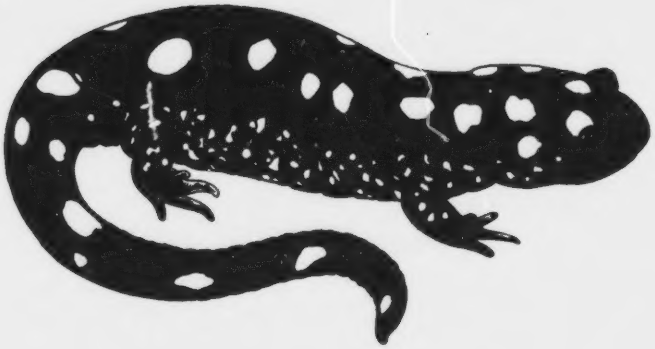
Spotted Salamander

(Ambystoma maculatum)



RANGE: Nova Scotia and the Gaspé Peninsula to s. Ontario, s. through Wisconsin, s. Illinois excluding prairie regions, to e. Kansas and Texas, and through the Eastern United States, except Florida, the Delmarva Peninsula, and s. New Jersey.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common though populations declining, probably due to acid precipitation.

HABITAT: Fossorial; found in moist woods, steambanks, beneath stones, logs, boards. Prefers deciduous or mixed woods on rocky hillsides and shallow woodland ponds or marshy pools that hold water through the summer for breeding. Usually does not inhabit ponds containing fish (Anderson 1967a). Terrestrial hibernator. In summer often wanders far from water source. Found in low oak-hickory forests with creeks and nearby swamps in Illinois (Cagle 1942, cited in Smith 1961:30). Have been found in the pitch pine-scrub oak community of the Albany Pine Bush (Stewart and Rossi 1981), dense oak forests in Rhode Island.

SPECIAL HABITAT REQUIREMENTS: Mesic woods with semipermanent water for breeding. Eggs tolerate pH range of 6 to 10 with best hatching success at pH 7 to 9 (Pough and Wilson 1976). High embryonic mortality occurred in temporary pools with pH below 6.0 in New York (Pough 1976).

AGE/SIZE AT SEXUAL MATURITY: During second year. Males may mature 1 year earlier than females (Wacasey 1961).

BREEDING PERIOD: March to mid-April. Mass breeding migrations occur in this species: individuals enter and leave breeding ponds using the same track each year, and exhibit fidelity to breeding ponds (Shoop 1956, 1974). Individuals may not breed in consecutive years (Husting 1965). Breeding migrations occur during steady evening rainstorms.

EGG DEPOSITION: 1 to 6 days after first appearance of adults at ponds (Bishop 1941:114).

NO. EGGS/MASS: 100 to 200 eggs, average of 125, laid in large masses of jelly, sometimes milky, attached to stems about 15 cm (6 inches) under water. Each female lays 1 to 10 masses (average of 2 to 3) of eggs (Wright and Allen 1909). Woodward (1982) reported that females breeding in permanent ponds produced smaller, more numerous eggs than females using temporary ponds.

TIME TO HATCHING: 31 to 54 days (Bishop 1947:145). In a cold (≤ 10°C) 50°F) spring-fed pond, eggs developed in 60 days in Rhode Island (Whitford and Vinegar 1966), Shoop (1974) reported 8 to 14 days.

LARVAL PERIOD: 61 to 110 days, and as short as 15 to 60 days (Shoop 1974); found overwintering in Nova Scotia (Bleakney 1952) and Rhode Island (Whitford and Vinegar 1966). Transforms July to September.

HOME RANGE/MOVEMENT: Individuals have been found up to a quarter of a mile (400 m) from the nearest breeding site in North Carolina (Gordon 1968). Will travel 91.2 to 182.4 m (300 to 600 feet) from woods to ponds to

Spotted Salamander (Continued)

(Ambystoma maculatum)

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open meadows in New York (M. Stewart, personal communication). Individuals were found to use subterranean rodent burrows as retreats; tagged salamanders that were monitored were found within a 300-cm^2 area of these burrows. Displaced adults moved up to 500 m to return to breeding ponds in Massachusetts (Shoop 1968). Average migration of 150 m from breeding ponds in Kentucky 6- to 220-m range in thick oak-hickory forest. Linear migration was unaffected by the presence or absence of vegetation or change in the topography (Douglas and Monroe 1981).

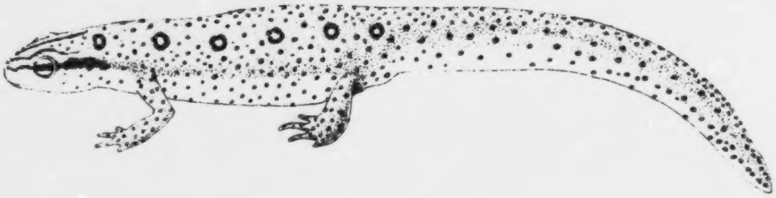
FOOD HABITS/PREFERENCES: Earthworms, snails, slugs, insects, spiders, particularly larval and adult beetles (Wacasey 1961). Larval stage may also eat small fish. Cannibalism by larvae occurs under crowded conditions.

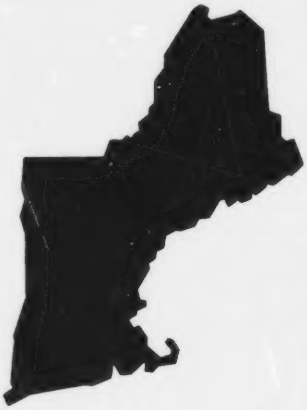
COMMENTS: Nocturnal; travel only on ground surface for migrations to and from breeding pools. Rainfall, snowmelt, or high humidity coupled with air temperature of 10°C (50°F) or more, are necessary for migrations to breeding pools. Numbers may be declining primarily due to over-collection and acid rain.

KEY REFERENCES: Anderson 1967a, Douglas and Monroe 1981, Shoop 1965.

Red-spotted Newt

(Notophthalmus v. viridescens)





RANGE: Nova Scotia and Gaspé Peninsula w. to the n. shore of Lake Superior and e. Michigan s. to c. Alabama. nc. Georgia. Absent along coast from se. South Carolina, southward.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Adults found in ponds, particularly water with abundant submerged vegetation, and in weedy areas of lakes, marshes, ditches, backwaters, and pools of shallow slow-moving streams or other unpolluted shallow or semipermanent water. Terrestrial juveniles (efts) live in moist areas on land, typically under damp leaves, under brush piles or logs and stumps, usually in wooded habitats. More common in areas of higher elevation in Connecticut (M. Klemens, personal communication; from sea level to an elevation of 1.6 km on Mt. Marcy in the Adirondacks (M. Stewart, personal observation). Moist beech-maple-hemlock woods in New York (Hurlbert 1969), and oak-pine woods in Massachusetts (Healy 1974). May be seen moving about on wet days in spring and summer. Efts hibernate on land, burrowing under logs and debris, but most adults remain active all winter underwater in pond bottoms or in streams. During winter months often found semiactive in groups of 20 to 40 (Morgan and Grierson 1932).

SPECIAL HABITAT REQUIREMENTS: Water with aquatic vegetation for the adult newt.

AGE/SIZE AT SEXUAL MATURITY: 2 to 8 years (Healy 1974). Aquatic juveniles feed almost year-round and mature in 2 years. The eft feeds only during rainy summer periods and requires more time to reach maturity.

BREEDING PERIOD: Spring (April to June), fall (August to October), sometimes November to December (Hurlbert 1969). Characteristically breed in lakes, ponds, and swamps (Hurlbert 1970).

EGG DEPOSITION: Late March to June.

NO. EGGS/MASS: 200 to 375 eggs (Bishop 1941:64), laid in water, attached singly to the leaves of aquatic plants.

TIME TO HATCHING: 3 to 5 weeks (Logier 1952:64), temperature dependent.

LARVAL PERIOD: 12 to 16 weeks. Postlarval migration from aquatic to terrestrial habitat occurs from summer through late fall during diurnal rainfall in New York (Hurlbert 1970).

HOME RANGE/MOVEMENT: Approximately 270 m^2 for red efts (juveniles) in an oak-pine woodland in western Massachusetts; maximum daily movement was 13 m (Healy 1974). Average movement along the edge of a small pond in Pennsylvania was 10.1 feet (3.1 m) for females, and 11.2 feet (3.4 m) for males; most individuals remained within 5 feet (1.5 m) of shore (Bellis 1968). Harris (1981) reported that all movement was random for 323 males in a Virginia pond and so considered males to be nonterritorial.

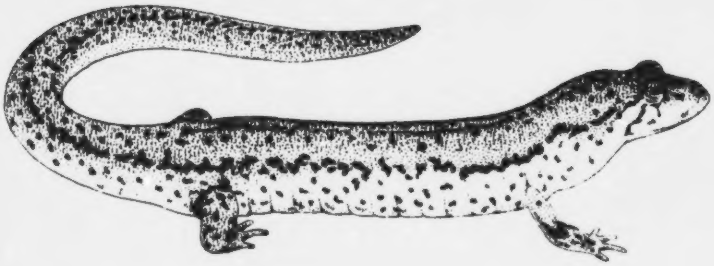
FOOD HABITS/PREFERENCES: Both larvae and adults (Hamilton 1932) are opportunistic feeders (Burton 1977). Insects and their larvae, particularly mayfly, caddisfly, midge and mosquito larvae (Ries and Bellis 1966), springtails (MacNamara 1977); tadpoles, frog eggs, worms, leeches, small mollusks and crustaceans, spiders, mites, occasionally small minnows (Hamilton 1932), salamander eggs also a major food item (T. Tyning, personal communication). Also ingests molted skin. Snails are an important food source for the red eft (Burton 1976). Cannibalism on their own larvae provides an important component of the diet in July and August (Burton 1977).

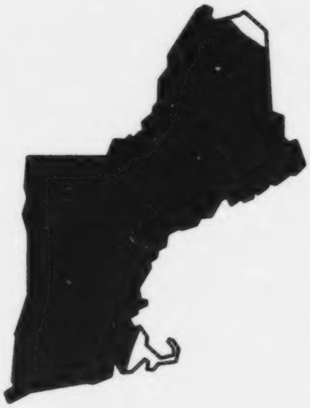
COMMENTS: Mates in ponds and streams. The red eft remains on land for 2 to 7 years; most remain on land 4 to 5 years, then return to the water where they transform to aquatic adults (Healy 1974). Neotenic individuals have been found on the Coastal Plain in Massachusetts and in New York (Bishop 1941:73-75). Some individual populations omit the terrestrial eft stage. Skin secretions of red efts are highly toxic — about 10 times more toxic than those of adults (Brodie 1968).

KEY REFERENCES: Bishop 1947, Mecham 1967.

Northern Dusky Salamander

(Desmognathus f. fuscus)





RANGE: Southern New Brunswick and s. Quebec to se. Indiana and c. Kentucky to the Carolinas; throughout the Northeast excluding s. New Jersey.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to abundant.

HABITAT: In woodlands at the margins of cool running water — favors clear rocky streams, in springy banks, seepage areas, beds of semidry brooks; under the cover of wet leaves, moss, rock piles, other debris, or in burrows in the soil. Ventures from streamside only during wet weather. Occurs from sea level to mountain elevations. Moves under logs and rocks in deeper water to hibernate in September. May remain active throughout the winter in stream bottoms or deep in unfrozen soil (Ashton and Ashton 1978). Formerly found in bluffs overlooking the Harlem River in Manhattan (Gans 1945).

SPECIAL HABITAT REQUIREMENTS: Permanent streams or seeps in woodlands.

AGE/SIZE AT SEXUAL MATURITY: Variable: about 3 years (Dunn 1926:92), most males at 3.5 years, females deposit first eggs at 5 years (Organ 1961). Some males mature at 2 years, females at 3 years (Danstedt 1975). Body size at maturity varies among populations (Tilley 1968).

BREEDING PERIOD: Breeding occurs in either late spring or fall (Bishop 1941:212-213). Possible that females breed biennially (Organ 1961). Breeds in ponds or streams.

EGG DEPOSITION: June to September in Connecticut (Babbitt 1937). Female guards the eggs in damp hollows beneath stones, under loose bark of logs, between wet leaf litter layers and in moss close to the water's edge. Larvae move to water where development continues (M. Stewart, personal communication). Clutches found less than 50 cm from the edge of streams and springs or in seepage areas (Krysik 1980).

NO. EGGS/MASS: 8 to 28 stalked eggs in compact clusters, average 17 (Bishop 1941:314).

TIME TO HATCHING: 7 to 8 weeks in Massachusetts (Wilder 1917), 5 to 8 weeks, New York (Bishop 1941;318), about 10 weeks, Connecticut (Babbitt 1937:16).

LARVAL PERIOD: 7 to 10 months, usually transform in June (Wilder 1913:295). From 9 to 12 months in Maryland (Danstedt 1975).

HOME RANGE/MOVEMENT: Less than 10 feet (3 m) along a stream in a wooded ravine in Pennsylvania (Barthalmus and Bellis 1969). Average range of 1.4 m^2 in a gravel bottom stream in Ohio (Ashton and Ashton 1978). Aver-

Northern Dusky Salamander (Continued)

(Desmognathus f. fuscus)

age about 150 square feet (14 m^2) along a stream in Kentucky, maximum movement of 100 feet (30.5 m) as open water dried up (Barbour 1971:57). Average weekly movement less than 0.5 m (Ashton 1975). In an intermittent mountain stream, average for 5 individuals was 48 m^2 daily movements less than 2 m (Barbour et al. 1969b).

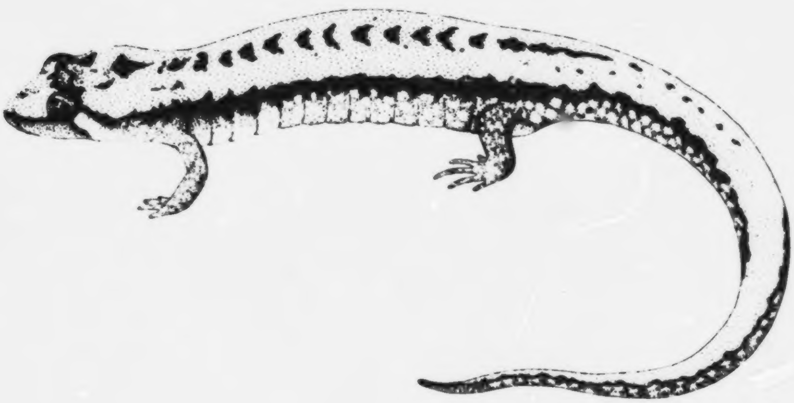
FOOD HABITS/PREFERENCES: Small aquatic and terrestrial invertebrates, insects — 96 percent of prey by weight (Burton 1976), grubs, worms, crustaceans, spiders, and occasionally mollusks; sometimes larvae of own species. Nocturnal feeder, also active on cloudy or rainy days.

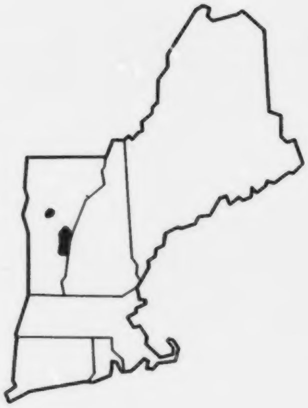
COMMENTS: Larval stage is aquatic; adults are riparian. Healy (1974) found efts most active on the forest floor when temperatures were above 13°C (55°F) and substrate was moist.

KEY REFERENCES: Ashton 1975, Bishop 1947, Organ 1961.

Mountain Dusky Salamander

(Desmognathus ochrophaeus)





RANGE: Appalachian mountains and uplands from New York to n. Georgia at altitudes ranging from a few hundred feet (approximately 60 m) above sea level to timberline in the s. Appalachians. One juvenile specimen from central Vermont, identification debated (Lazell 1976).

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare.

HABITAT: Semi-terrestrial, found along stream edges and on the forest floor. In wet woods under forest debris, logs, stones, sometimes beneath the bark of dead trees. Near water – small streams, springs, or seeps. Seeps and springs used for late autumn and winter hibernation. Individuals inhabiting seepage banks are active earlier in spring and later in the fall than streamside individuals (Keen 1979).

SPECIAL HABITAT REQUIREMENTS: Seeps, springs, or streams in woodland areas.

AGE/SIZE AT SEXUAL MATURITY: About 3 years: females at 36 months deposit clutch; snout to vent length is 30 to 34 mm (Keen and Orr 1980).

BREEDING PERIOD: Spring, autumn, or winter (Fitzpatrick 1973).

EGG DEPOSITION: Annual cycle occurring in late winter/ spring or autumn, female guards eggs.

NO. EGGS/MASS: 11 to 14 eggs (Bishop 1941:335). Stalked eggs deposited in clusters underneath stones or logs in small cavities. Fecundity in *Desmognathus* depends on size (Tilley 1968).

TIME TO HATCHING: 50 to 70 days (Tilley 1972), hatching in fall and early spring.

LARVAL PERIOD: 2 to 8 months (Tilley 1970); in the southern Appalachians, larvae occasionally overwinter (Tilley 1973:129.1).

HOME RANGE/MOVEMENT: Average movement of 40 to 45 cm between captures of displaced and nondisplaced individuals in a rock-face habitat in North Carolina (Huheey and Brandon 1973). Homing to the nest shown by breeding females (Forester 1979). Females are philopatric, ovipositing in the same section of a stream in successive years (Forester 1977).

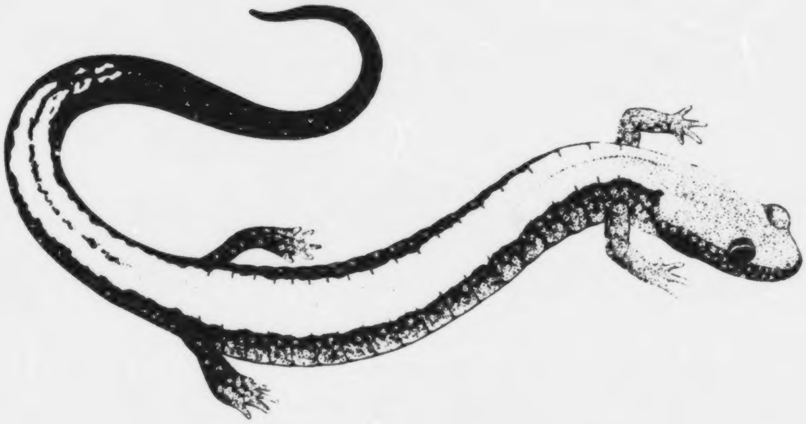
FOOD HABITS/PREFERENCES: Insects, including adult and larval forms of flies, beetles, wasps, and ants. Oligochaetes (Keen 1979), also takes other small arthropods (Huheey and Brandon 1973). Eats shed skin (Bishop 1941:341).

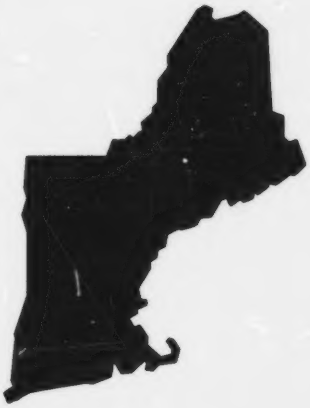
COMMENTS: Basically nocturnal but also active on dark humid days. Will climb trees and shrubs to feed.

KEY REFERENCES: Bishop 1947, Hairston 1949, Huheey and Brandon 1973, Tilley 1973.

Redback Salamander

(Plethodon cinereus)





RANGE: Nova Scotia w. to s. Ontario and e. Minnesota, s. in scattered colonies to Missouri, in the Smoky Mountains, in s. Tennessee and e. to Cape Hatteras.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Entirely terrestrial. Mixed deciduous or coniferous woods, inhabiting interiors of decaying logs and stumps, also found underneath stones, moist leaf litter, and bark. Wet areas and extremely moist bottomland avoided. Enters xeric, sandy habitats where moist microhabitats exist (M. Klemens, personal communication).

Hibernates down to 15 inch (38 cm) soil depth (Oliver 1955:121) or in rock crevices. May be active during mild winter weather (Mintor. 1972:67). In indiana, individuals were found active in an ant mound throughout the winter (Caldwell 1975). Found hibernating a 30 to 36 inch (76.2 to 91.4 cm) depth in decaying root systems of dead white oaks in se. Massachusetts (Hoff 1977). Has been found hibernating in aquatic situations in Maryland (Cooper 1956).

SPECIAL HABITAT REQUIREMENTS: Logs, stumps, rocks, and so on.

AGE/SIZE AT SEXUAL MATURITY: Generally during second year (Oliver 1955:277), but female usually reproduces in third year (Burger 1935). Males at 42.0 mm snout to vent length, females 44.8 mm snout to vent length in Michigan (Werner 1971).

BREEDING PERIOD: Biannual cycle, spring and late fall (October through December) in Maryland (Sayler 1966).

EGG DEPOSITION: June to July of next year.

NO. EGGS/MASS: 3 to 14 eggs, average 7 to 10, in small clusters attached to roof of small chamber, laid in and under rotted logs and stumps. Reproduce annually in Connecticut (Lotter 1978).

TIME TO HATCHING: 30 to 60 days (Oliver 1955:234), extending to 84 days in Maine (Banasiak 1974). Hatch in August to September. Larval stage is completed within egg.

HOME RANGE/MOVEMENT: Home range is small due to restricted horizontal movement (Taub 1961). Movement of less than 1 foot (30.5 cm) for 14 individuals in hardwood forest habitat in New Jersey; individuals usually found under the same object where initially captured (Taub 1961). Home ranges of 13 m^2 for females, about 24 m^2 for males were determined in a northern hardwood forest in Michigan (Kleeberger and Werner 1982).

FOOD HABITS/PREFERENCES: Small insects and their larvae, earthworms, snails, slugs, spiders, sowbugs, millipedes, mites (Surface 1913:95). Occasionally cannibalistic. Mites were the most important food, accounting for

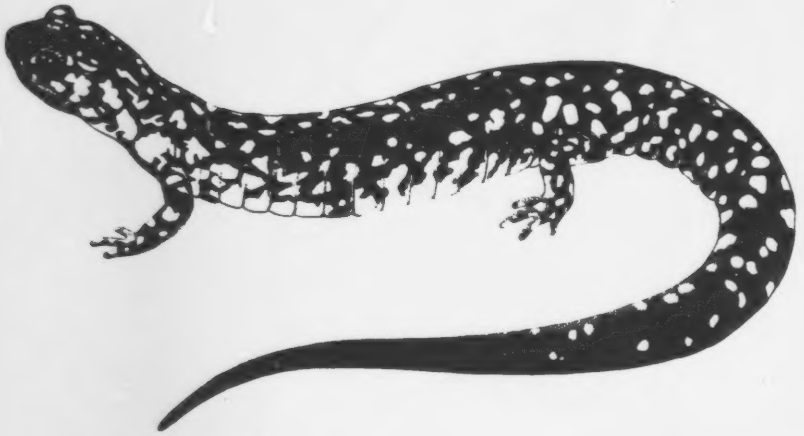
65 percent of the prey items in a New Hampshire study (Burton 1976), insects 73 percent by weight in a New York study (Jameson 1944). During rainy summer nights, found on leaf litter presumably foraging for food (Burton and Likens 1975). Often climbs tree trunks and shrubs in search of food, particularly during wet nights.

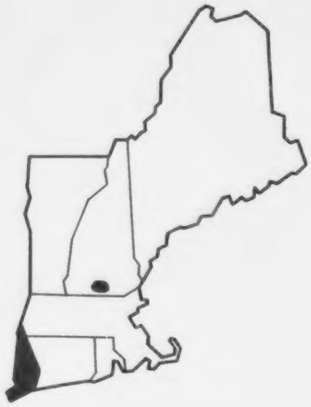
COMMENTS: Three distinct color phases occur: redback, leadback, and erythrystic. In Connecticut, the redback morph occurs almost exclusively in cold upland areas; in areas of more moderate climate and elevation, both redback and leadback morphs occur (M. Klemens, personal communication). All records of erythrystic individuals occur north of 41° and south of 47° latitude (Tilley et al. 1982). The redback salamander is the most abundant terrestrial vertebrate in New England and accounts for the greatest amount of vertebrate biomass in the Hubbard Brook Experimental Forest in New Hampshire (Burton and Likens 1975).

KEY REFERENCES: Heatwole 1962, Smith 1963.

Slimy Salamander

(Plethodon g. glutinosus)





RANGE: Extreme w. Connecticut through c. New York to e. Oklahoma, Arkansas, s. in Louisiana to c. Florida. Scattered colonies in s. New Hampshire and Texas.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Moist wooded hillside and ravines. Terrestrial, found underneath moist humus, manure piles, in crevices in rock, shale banks, and under logs in woodland areas. Bishop (1941:718) found the species most abundant in banks along highways and woodland openings. Has been found in second-growth oak-hickory forests and steep hemlock slopes of ravines in the Helderberg Mountains, New York (M. Stewart, personal communication), to an elevation of 1,768 m in Great Smoky Mountain National Park (Powders and Tietjen 1974). Also in mature mixed deciduous forests (Semlitsch 1980a). Hibernates underground from November to March or April.

SPECIAL HABITAT REQUIREMENTS: Rock outcroppings, logs within wooded areas.

AGE/SIZE AT SEXUAL MATURITY: Females mature at about 4 years and lay eggs in the fifth year, males at 4 years (Highton 1962). Snout to vent length is 59 to 74 mm in females, 53 to 70 mm in males (Highton 1962).

BREEDING PERIOD: Autumn and spring (Highton 1956).

EGG DEPOSITION: Probable biennial oviposition occurring in late spring or early summer in northern populations (Highton 1962). Eggs laid within rock crevices or rotted logs (Smith 1961:58), also found in caves (Bishop 1941:224).

NO. EGGS/MASS: 13 to 34 eggs, average 16 to 17 (Highton 1962). Eggs aggregated in a thin envelopment. Fecundity increases with body size. (Semlitsch 1980a).

TIME TO HATCHING: Probably in late summer; entire larval period spent within egg.

HOME RANGE/MOVEMENT: Twenty-two individuals in n. Florida were recaptured at or within 4 feet (1.2 m) of the original capture point (Highton 1956). Adult home ranges are less than 9 m diameter; immatures range is less than 6 m diameter, in oak-hickory forest with thick leaf litter in North Carolina. Mean movement distances were 17.5 m for males, 14.3 m females, and 4.2 m juveniles. Probably capable of movements more than 90 m beyond home-range area (Wells and Wells 1976).

FOOD HABITS/PREFERENCES: Euryphagic (Powders and Tietjen 1974). Mostly insects, also sowbugs, worms, centipedes, spiders, slugs, and snails (Hamilton 1932). Availability probably governs feeding habits. Ants and beetles were the most abundant food items in a Virginia study, accounting for 58 percent of the total weight of food (Davidson 1956).

COMMENTS: Nocturnal, may be active during some rainy days. During hot, dry spells found deep underground or under logs in dense aggregations (Wells and Wells 1976).

KEY REFERENCES: Bishop 1941; Highton 1956, 1962.

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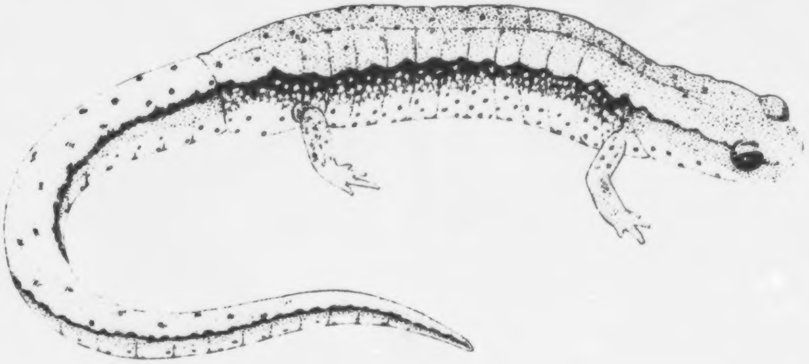
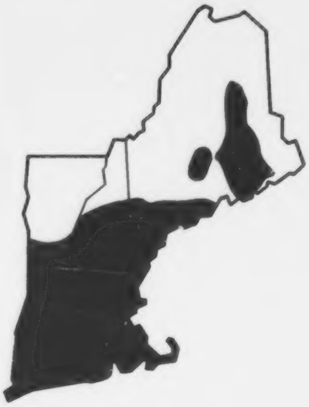
Four-toed Salamander

(Hemidactylium scutatum)





RANGE: Nova Scotia w. to s. Ontario and Wisconsin, s. to Alabama and Georgia. Absent from most of n. New England. Scattered disjunct populations occur in the Eastern United States.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Wet woodlands, preferably with sphagnum moss; shaded, shallow woodland pools; tamarack bogs. Hides in moss, in moist decaying wood, under stones or wet leaves. Prefers an acidic environment. Found in beech/maple, yellow birch/maple and other hardwood forests, found less often in coniferous woods (Neill 1963:2.1). In mixed forests in New York (Bishop 1941:190). Larval stage is aquatic, found in pools and quiet streams with an abundance of moss. Typically hibernates in decaying root systems of trees. Aggregations may appear during hibernation with rotted wood or leaf litter (Blanchard 1933b). Maple, alder sapling swamp in Connecticut (C. Raithel, personal communication).

SPECIAL HABITAT REQUIREMENTS: Acidic wet woodlands.

AGE/SIZE AT SEXUAL MATURITY: About 2-1/2 years (Barbour 1971:74).

BREEDING PERIOD: Late summer and autumn, peak in fall. Breeding area adjacent to mixed hardwood or northern conifer woods in West Virginia (N. Green, personal observation) and Albany County, New York (M. Stewart, personal communication), and Michigan (Blanchard 1923).

EGG DEPOSITION: March to April or May (Blanchard 1934, Barbour 1971:73). Nests located next to and just above water.

NO. EGGS/MASS: 19 to 50 eggs (Dunn 1926:200, 202), average 50 in New York (Bishop 1941:183). Communal nesting may occur with up to 800 eggs laid per nest. One to four females will remain with eggs (Wood 1953). Eggs laid singly; adhered to moss, in natural cavities or in depressions formed by the female, also among roots, decayed leaves.

TIME TO HATCHING: 38 to 60 days (Blanchard 1934).

LARVAL PERIOD: 6 weeks (Blanchard 1923); as long as 18 weeks; variation in larval development depends upon pond conditions (Bishop 1941:186).

HOME RANGE/MOVEMENT: Unreported.

FOOD HABITS/PREFERENCES: Small invertebrates, including insects, spiders, and earthworms.

COMMENTS: A nocturnal and secretive species, therefore difficult to locate.

KEY REFERENCES: Bishop 1947, Neill 1963.

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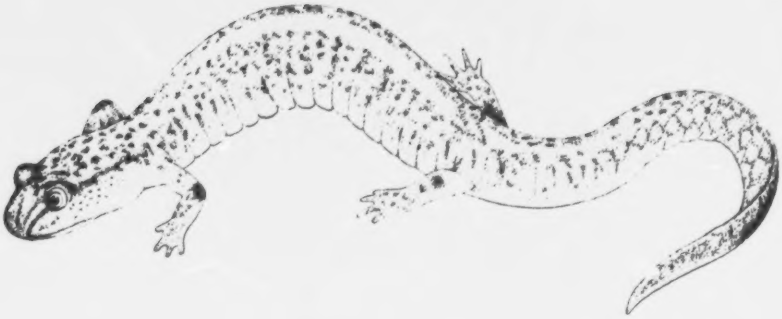
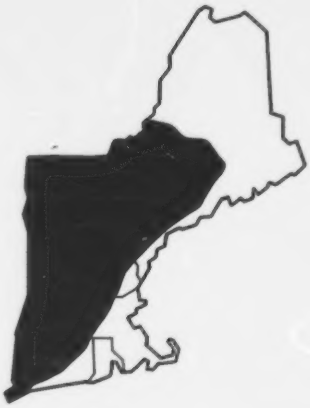
Northern Spring Salamander

(Gyrinophilus p. porphyriticus)





RANGE: Through the Appalachian range from wc. Maine and extreme se. Quebec s. to e. Ohio and c. Alabama, Pennsylvania and n. New Jersey. Absent from the Coastal Plain. Recently reported from Rhode Island (C. Raithel, personal communication).

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare, except in Vermont and nw. Berkshire County, Massachusetts, where common (T. Tyning, personal communication).

HABITAT: Found in but not restricted to forested areas with clear, cold water, springs mountain streams, creeks, boggy areas. Also in depressions under stones or other cover adjacent to water. Usually occurs at higher elevations in spruce/fir forests, typically in moist situations, in underground water courses and limestone caves (N. Green, personal observation), beech/maple/hemlock forests, in shale ravine streams in Tompkins and Albany Counties, New York (M. Stewart, personal communication). Have been found in hillside meadow streams, swamps, and lake margins.

SPECIAL HABITAT REQUIREMENTS: Streams, seeps, or springs. In winter, wet soil near water where remains somewhat active in burrows.

AGE/SIZE AT SEXUAL MATURITY: 4 to 5 years, at total length of about 5-1/2 inches (14 cm) in New York (Bishop 1947:370).

BREEDING PERIOD: Mid-October to winter months (Bruce 1972). Annual reproduction cycle (Bruce 1969).

EGG DEPOSITION: April to summer and into the fall (Bruce 1972), female guard eggs (Organ 1961).

NO. EGGS/MASS: 9 to 63 (Bruce 1972), 44 to 132 eggs, New York (Bishop 1941:247), 44 to 66, Virginia (Organ 1961). Eggs laid in running water under logs and stones, usually in groups, sometimes attached singly.

TIME TO HATCHING: Fall (Organ 1961). Hatch late summer, early fall. The young from one clutch may remain near the nest site for several months after hatching (Bruce 1980).

LARVAL PERIOD: Variable larval period, average of about 4 years. Metamorphosis occurs in late spring summer (Bruce 1980). Larvae are aquatic.

HOMERANGE/MOVEMENT: Unreported.

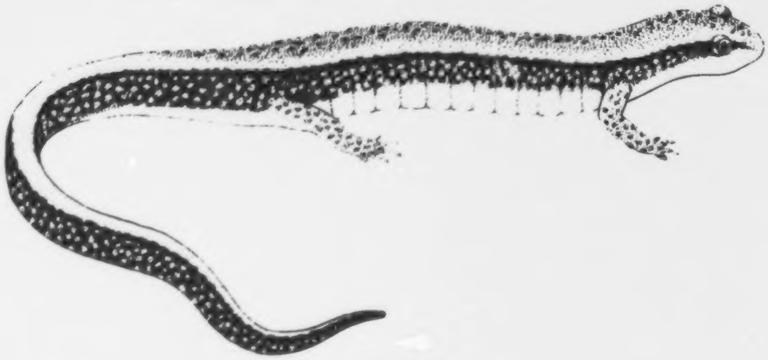
FOOD HABITS/PREFERENCES: Euryphagic predator — consumes aquatic insects and their nymph and larval forms, crustaceans, centipedes, earthworms, snails, spiders, millipedes, small frogs, and salamanders. Terrestrial insects were 79 percent of total prey items in New Hampshire (Burton 1976). Has been found to eat its own larvae (Logier 1952:76). Salamanders account for 50 percent of the diet in the Appalachians (Bruce 1972); salamanders a minor part of diet in New York (Bishop 1941:253). Nocturnal, forages for food among rocks and vegetation in or along stream beds on rainy summer nights. Larvae are generalist feeders until metamorphosis when they take larger food items (Bruce 1980).

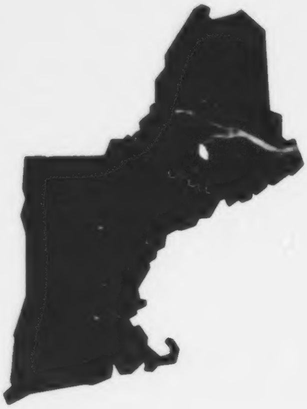
COMMENTS: Formerly named the purple salamander.

KEY REFERENCES: Bishop 1941; Brandon 1967; Bruce 1972, 1980.

Northern Two-lined Salamander

(Eurycea b. bislineata





RANGE: Gaspé Peninsula, Quebec and e. Ontario sw. through Ohio to e. Illinois, s. to extreme ne. Mississippi to Virginia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to abundant.

HABITAT: Floodplain bottoms to moist forest floors at high elevations to 1,829 m (6,000 feet) (Behler and King 1979:321). Along brooks and streams, boggy areas near springs or seeps. Found under objects at water's edge in moist soil or in coarse sand and gravel at stream bottoms or edges, leaf litter and crayfish burrows (Ashton and Ashton 1978). In wet woodlands or pastures. During wet or humid weather will wander into moist woods more than 100 m from water courses (D. Rudis, personal observation).

Hibernates under water, or remains active in feeding aggregations in springs and cold-flowing streams in New York (Stewart 1956a) and adjacent unfrozen soil (Ashton and Ashton 1978).

SPECIAL HABITAT REQUIREMENTS: Alkaline streams for breeding.

AGE/SIZE AT SEXUAL MATURITY: The majority mature during the second fall after metamorphosis (Stewart 1956a).

BREEDING PERIOD: Autumn and early spring. Breeds in streams.

EGG DEPOSITION: May to early June in Massachusetts (Johnson and Goldberg 1975).

NO. EGGS/MASS: 12 to 36 eggs, average of 18 eggs in Massachusetts (Wilder 1924). Eggs deposited in clusters attached to bottoms of stones or logs in running water. Several females may use the same stone as a nest site, one female remains with eggs until hatching.

TIME TO HATCHING: 1 to 2 months after eggs laid.

LARVAL PERIOD: 2 or 3 years, aquatic (Wilder 1924).

HOME RANGE/MOVEMENT: Average area less than 14 m^2 for 20 monitored individuals along a stream in Ohio (Ashton and Ashton 1978). Territories were aggressively defended in an artificial environment (Grant 1955).

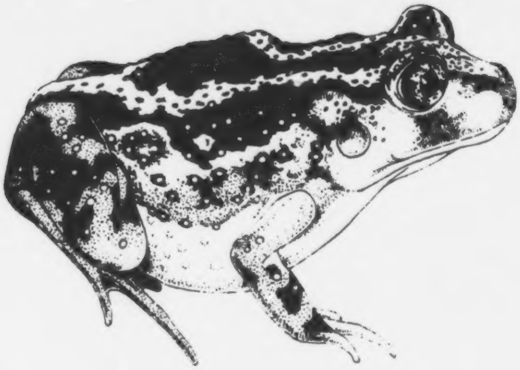
FOOD HABITS/PREFERENCES: Insects, particularly beetles, beetle larvae, mayflies, stonefly nymphs, and dipterans; also spiders, mites, millipedes, sowbugs, and earthworms (Hamilton 1932). Most prey are of terrestrial origin (Burton 1976).

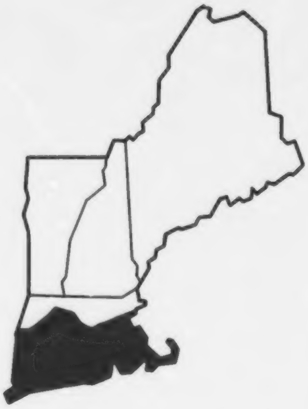
COMMENTS: Will travel in the open during wet or rainy nights, rarely during wet days. Adults are extremely agile and when disturbed often escape through a series of rapid jumps.

KEY REFERENCES: Bishop 1941, Bleakney 1958, Mittleman 1966.

Eastern Spadefoot

Scaphiopus h. holbrookii





RANGE: Southeastern Massachusetts extending to New York and se. Missouri, s. to e. Louisiana and Florida. Not found in the higher elevations of the Appalachians or the Everglades of Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare.

HABITAT: In dry sandy or loose soils in sparse shrub growth or open forest areas. Terrestrial and subterranean, only enters water to breed, usually in temporary rain pools. Prefers forest areas with leaf litter (Pearson 1955). In farmland areas in Connecticut River Valley, Massachusetts, and pitch pine — scrub oak dunes in New York (Stewart and Rossi 1981). Colonies occur along floodplains of major rivers. Emerge in spring from hibernation when soil moisture is sufficient.

SPECIAL HABITAT REQUIREMENTS: Sandy soils, temporary pools for breeding.

AGE/SIZE AT SEXUAL MATURITY: During second year after metamorphosis, males at 15 months, females at 19 months (Pearson 1955).

BREEDING PERIOD AND EGG DEPOSITION: Usually April or May, extending into August; breeding is initiated by a heavy rainfall (Gosner and Black 1955). Breeds in congregations of many individuals if population is high. Usually a one-night phenomenon.

NO. EGGS/MASS: 1,000 to 2,500 eggs in masses of 6 to 110 in irregular bands in or around plants of temporary water. Eggs are very adhesive.

TIME TO HATCHING: 5 to 15 days (Oliver 1955:236).

TADPOLES: Late broods transform in 16 to 20 days (Gosner and Black 1955), 48 to 63 days for early broods (Driver 1936).

HOME RANGE/MOVEMENT: Mean home range about 10 m^2 108 square feet in n. Florida, for 90 percent of captures average home range was about 6.2m^2 (67 square feet); occupy one or several underground burrows within home range (Pearson 1955). Maximum dispersal distances of 9.8 m 32 feet; individuals were recaptured in the same home ranges after 5 years (Pearson 1957).

FOOD HABITS/PREFERENCES: Flies, spiders, crickets, caterpillars, true bugs, other ground-dwelling arthropods, earthworms, and snails. Moths are eaten when they can be caught (Bragg 1965:36). Tadpoles are planktonic feeders for the first few days (Richmond 1947), later becoming carnivorous and sometimes even cannibalistic.

COMMENTS: Nocturnal, peaks of activity occur just after sundown and before sunrise. Fossorial; individuals have remained in burrows an average of 9.5 days at a time, emerging to feed (Pearson 1955). Can remain underground for weeks or months during dry periods, to depths of 3 to 7 feet (1to 2 m) (Ball 1933, cited in Babbitt 1937:20). As evidence of the spadefoot's secretive and nocturnal habits, there was a total of 16 reported sightings from 1811 to 1936 in the ne. part of its range (Ball 1936, cited in Bragg 1956).

KEY REFERENCES: Ball 1936, Bragg 1956, Pearson 1955, Wasserman 1968.

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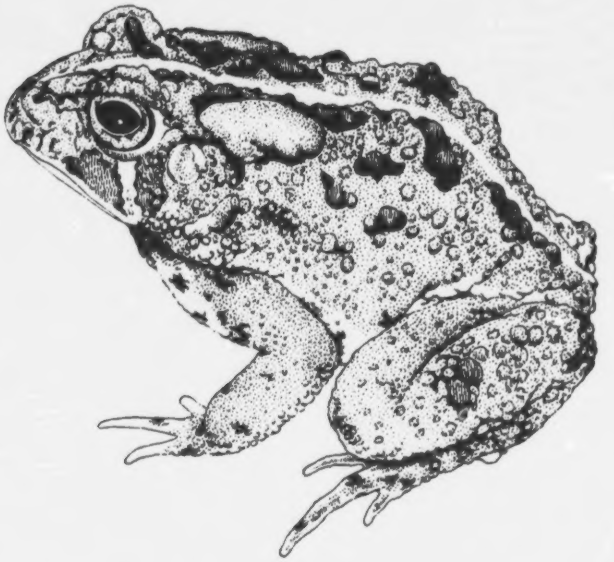
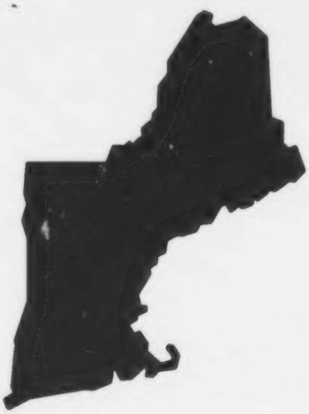
Eastern American Toad

(Bufo a. americanus)





RANGE: Nova Scotia and the Gaspé Peninsula w. through c. Ontario to Lake Winnipeg, s. to e. Kansas, c. Indiana, c. Alabama and c. North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Found in almost any habitat: gardens, woods, yards with cover, damp soil and a food supply. Sea level to mountain elevations. Usually in moist upland woods.

SPECIAL HABITAT REQUIREMENTS: Needs shallow water for breeding. Hibernates in burrows underground to 12 inches (30.5 cm) deep (Oliver 1955:122) from October to late March or April.

AGE/SIZE AT SEXUAL MATURITY: 3 to 4 years (Dickerson 1969:72), 2 to 3 years (Hamilton 1934).

BREEDING PERIOD AND EGG DEPOSITION: Early April to July, peak in late April in the Northeast. Travels to breeding ponds at night in large numbers (Maynard 1934).

NO. EGGS/MASS: 4,000 to 12,000 eggs (Dickerson 1969:67). Laid in long curling strings amidst aquatic vegetation.

TIME TO HATCHING: About 3 to 12 (average 4) days.

TADPOLES: 5 to 10 weeks.

HOME RANGE/MOVEMENT: Exhibits homing behavior by returning to breeding sites; 264 individuals used the same site annually in Ontario (Oldham 1966). Newly metamorphosed toads showed celestial orientation when leaving ponds; as most movement is nocturnal, course determination is probably during daylight hours (Dole 1973).

FOOD HABITS/PREFERENCES: Terrestrial arthropods, including insects, sowbugs, spiders, centipedes, and millipedes. Slugs and earthworms are other invertebrate foods. Some vegetable matter is taken accidentally. Food species determined by availability (Hamilton 1954). Feeds from twilight through the evening hours.

COMMENTS: Most active during evening hours. May bask (M. Stewart, L. White, personal observation) but will seek cover during the heat of the day. Calls and breeds during the day at the peak of breeding season (T. Tyning, personal communication).

KEY REFERENCES: Hamilton 1954, Wright and Wright 1949.

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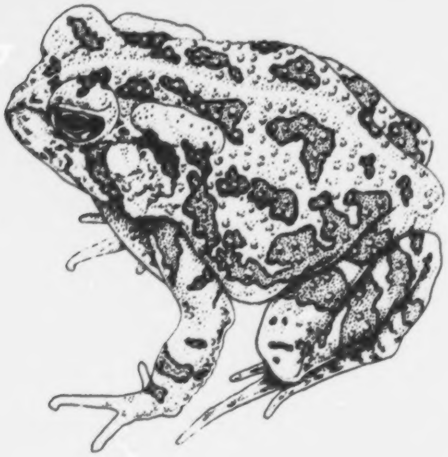
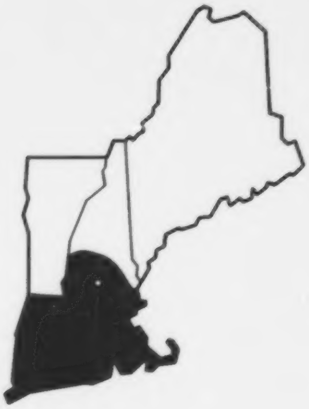
Fowler's Toad

(Bufo woodhousii fowleri)





RANGE: Southern New England w. to c. Pennsylvania, the n. shore of Lake Erie and e. shore of Lake Michigan s. to Missouri, e. Oklahoma, Texas, c. Georgia and South Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon but locally abundant.

HABITAT: Prefers areas with sandy soil—shorelines, river valleys, beaches, and roadside areas. Usually found in lowland areas, but frequently in pine and oak forests, gardens, lawns and fields, also found in small marshy ponds. Hibernates in burrows in welldrained sandy soils to 3 feet (0.9 m) deep from early fall to late spring (May in Connecticut).

SPECIAL HABITAT REQUIREMENTS: Sandy soils, shallow water for breeding.

AGE/SIZE AT SEXUAL MATURITY: Probably breeds during third year (Stille 1952).

BREEDING PERIOD AND EGG DEPOSITION: Late April to May extending to mid-August (2 to 4 weeks later than *Bufo a. americanus).* Shallow water of pools, lake margins, ditches, and so on, necessary for breeding.

NO. EGGS/MASS: Up to 8,000 eggs laid in long strings in aquatic vegetation (Wright and Wright 1949:212).

TIME TO HATCHING: About 1 week.

TADPOLES: 40 to 60 days, usually transform midsummer.

HOME RANGE/MOVEMENT: Average distances between captures ranged from 22 to 32 m during a 3-year period on a golf course in Connecticut (Clarke 1974). Night movements of 200 to 700 feet (61 to 213 m) or more to reach waters' edge (Lake Michigan). Toads usually found within 100 feet (30.5 m) of previous capture point (Stille 1952).

FOOD HABITS/PREFERENCES: Chiefly ground-dwelling insects, particularly ants and beetles; also consumes earthworms, spiders, snails, and slugs.

COMMENTS: During evening hours may move to edge of water to replenish body moisture (Stille 1952). May be active during the day, but typically crepuscular (Minton 1972:95). Activity periods vary with populations, mostly nocturnal in Connecticut (Clarke 1974).

KEY REFERENCES: Clarke 1974, Logier 1952, Wright and Wright 1949.

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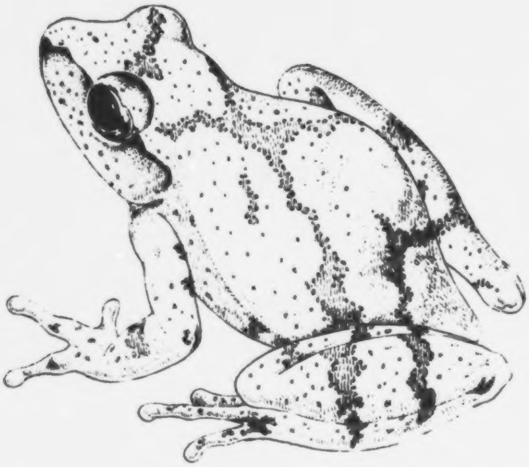
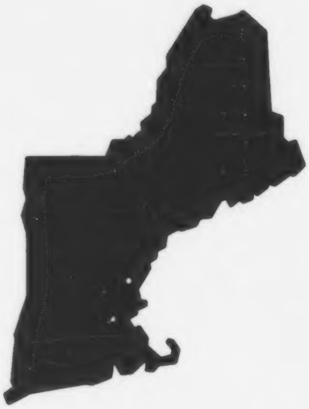
Northern Spring Peeper

(Hyla c. crucifer)





RANGE: Nova Scotia, the Gaspé Peninsula and Quebec to the s. tip of Hudson Bay through Ontario to Lake Winnipeg, s. to e. Texas and throughout the Eastern United States, except Florida and s. Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to abundant.

HABITAT: Marshy or wet woods, second growth woodlots, sphagnum bogs, nonwooded lowlands, near ponds and swamps. Found on the ground or burrowed into the soil. Breeds in permanent or temporary water, usually woodland ponds with aquatic debris. Found in cool moist woods after breeding (M. Stewart, personal observation). Hibernates on land during late November to January or early spring, under moss and leaves.

SPECIAL HABITAT REQUIREMENTS: Pools for breeding.

AGE/SIZE AT SEXUAL MATURITY: Early in second year at about 20 mm snout to vent length (Delzell 1958).

BREEDING PERIOD AND EGG DEPOSITION: Early March to June (in the North).

NO. EGGS/MASS: 800 to 1,000 eggs (Wright 1914:16). Laid singly near the bottom of shallow weedy ponds, attached to submerged plants (Oliver 1955:236).

TIME TO HATCHING: 6 to 12 days.

TADPOLES: 90 to 100 days (Wright 1914:42). Usually transform during July (Wright and Wright 1949:314).

HOME RANGE/MOVEMENT: In s.e. Michigan, home-range diameters ranged from 4 to 18 feet (1.2 to 5.5 m), established around forest debris and vegetation; average daily travel was 20 to 130 feet (6.1 to 39.6 m) reported by Delzell (1958).

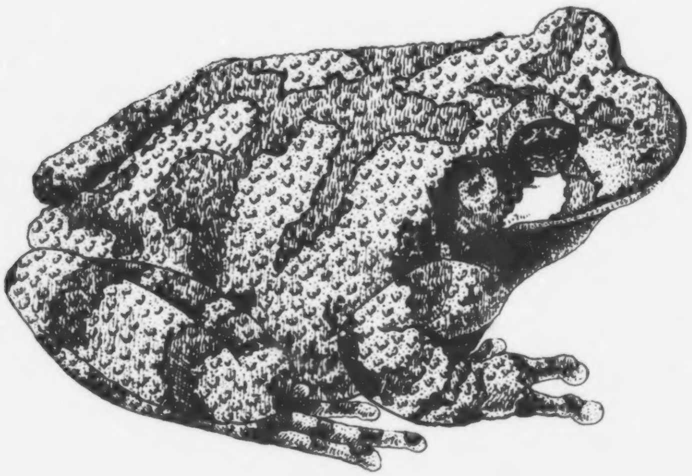
FOOD HABITS/PREFERENCES: Small nonaquatic insects: preferably ants, flying bugs, beetles, flies, springtails, and spiders; also mites, ticks, and small snails. Foods taken probably reflect availability, catchability, and size rather than preference (Oplinger 1967).

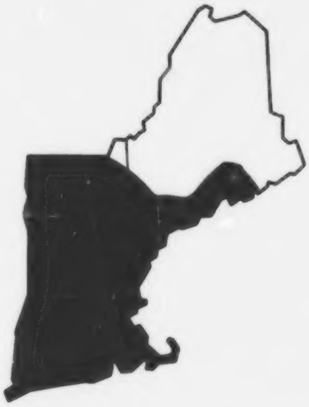
COMMENTS: Young frogs terrestrial in first year (Delzell 1958). May move long distances from breeding areas in summer and fall, single calls heard from woods, shrubby openings, far from water (M. Stewart, personal observation).

KEY REFERENCES: Delzell 1958, Logier 1952, Wright and Wright 1949.

Gray Treefrog

(Hyla versicolor)





RANGE: Eastern United States and s.e. Canada from s. Maine to Manitoba and s. through c. Texas and the Gulf states to c. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Forested regions with small trees, shrubs and bushes near or in shallow water. Often found on moss or lichen on bark of old trees. Will breed in temporary pools or permanent water, swamps, bogs, ponds, weedy lakes, and roadside ditches; breeding sites are extremely variable. Commonly inhabit moist areas in hollow trees, under loose bark, or in rotted logs during summer months, (Smith 1961:93). Hibernate under tree roots, under leaves (Babbitt 1937).

SPECIAL HABITAT REQUIREMENTS: Aquatic sites for breeding.

AGE/SIZE AT SEXUAL MATURITY: Breeds at 3 years (Palmer 1949:455).

BREEDING PERIOD: Early May to July, Connecticut (Babbitt 1937). May to August in the Southeast (Martof et al. 1980:116). Season varies with latitude (Smith 1961:93). Peak in early May, Ithaca, New York (Wright 1914:44).

EGG DEPOSITION: Generally 20 to 35 days between first appearance and first eggs (Wright 1914:47). Loosely attached to vegetation on the surface of shallow water (Martof et al. 1980:116).

NO. EGGS/MASS: Total of 1,800 to 2,000 eggs (Wright 1914:49). Packets of 10 to 40 eggs (Martof et al. 1980:116), or 4 to 25 eggs (Smith 1961:93).

TIME TO HATCHING: 4 to 5 days (Babbitt 1937).

TADPOLES: 50 to 60 days, shorter period in warmer areas. Transform late in June to September.

HOME RANGE/MOVEMENT: Unreported.

FOOD HABITS/PREFERENCES: Small insects, spiders, plant lice, mites, and snails. Forages in vegetation and on the ground (Martof et al. 1980:116).

COMMENTS: Most active during evening hours when vocal both during and out of breeding season. Rarely found outside of breeding period. Able to change color from gray to green. Young are emerald green. Single calls heard occasionally in summer during during humid days, often before a storm. *H. versicolor* is a tetraploid species with 48 chromosomes (Martof et al. 1980:115). Noxious skin secretions by *H. versicolor* may repel predators (Brodie and Formanowicz 1981).

KEY REFERENCES: Logier 1952, Martof et al. 1980, Wright and Wright 1949.

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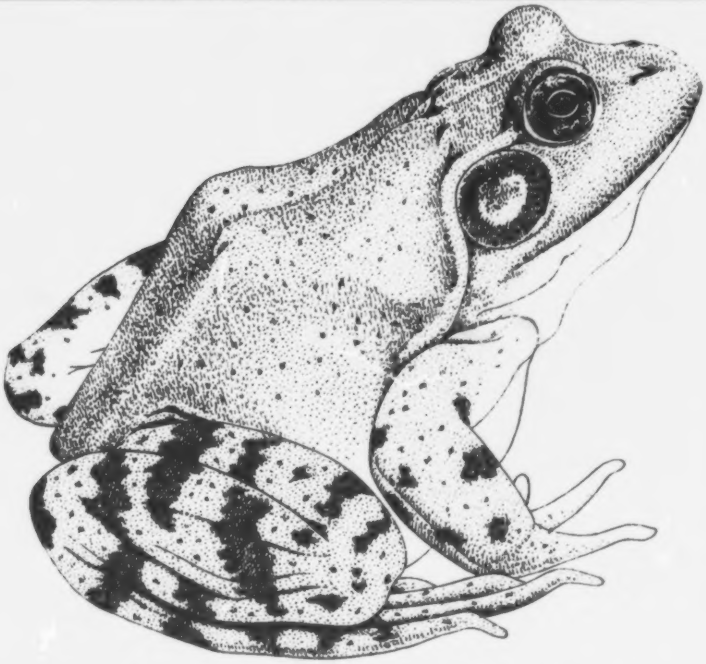
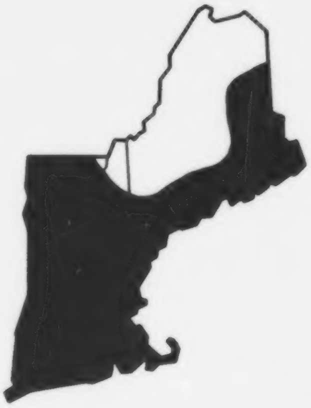
Bullfrog

(Rana catesbeiana)





RANGE: Nova Scotia w. to Wisconsin, s. through the Great Plains to e. Colorado, Texas and ne. Mexico; throughout the Eastern United States, except s. Florida and parts of n. Maine. Introduced in California and British Columbia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common, but formerly more abundant.

HABITAT: Near shorelines of large bodies of water with emergent vegetation, lakes, river oxbows. Highly aquatic. Tend to remain in same pools for the summer months if water level is stable (Raney 1940). Will occupy floating logs far from shore. Breed close to shore lines in areas sheltered by shrubs (Raney 1940). Hibernates under water in mud and leaves about mid-October, emeges late February to March, May in New York (Wright 1914:78).

SPECIAL HABITAT REQUIREMENTS: Deep permanent water and emergent vegetation.

AGE/SIZE AT SEXUAL MATURITY: In fourth or fifth year.

BREEDING PERIOD AND EGG DEPOSITION: Late May to July (in the North), peak in July.

NO. EGGS/MASS: 12,000 to 20,000 eggs (Wright 1914:82). Eggs laid in floating films of jelly in water of lakes, quiet streams, and ponds.

TIME TO HATCHING: 5 to 20 days (Oliver 1955:237). Often 4 days or less (Wright 1914:83).

TADPOLES: For 2 to 3 winters.

HOME RANGE/MOVEMENT: Average distance traveled in Summer, 200 to 300 feet (61 to 91 m) in a woodland lake and pond in New York (Raney 1940, Ingram and Raney 1943). Evening movement of 200 to 700 feet (61 to 213 m) to water in Michigan (Stille 1952). Home range of 131 bullfrogs in an Ontario pond had an average mean activity radius of 8.6 feet (2.6 m) with minimum and maximum movements of 2.0 feet (0.6 m) and 37.1 feet (11.3 m), respectively (Currie and Bellis 1969). Males defend territories during breeding season. In a Michigan study (Emlen 1968), the average distance between males within a chorus was 17.8 feet (5.4 m), implying an average minimum terrotorial radius of approximatelky 9 feet (2.7 m).

FOOD HABITS/PREFERENCES: Any available small animals; fish, other frogs, salamanders, newts, young turtles, snakes, small birds, mice, crayfish, insects, snails, and spiders. Also cannabalistic. Feeds among the water weeds; an indiscriminate and aggressive predator.

COMMENTS: The bullfrog has become rare in many areas, presumably due to toxic effects of DDT and other pollutants (M. Stewart, personal communication).

KEY REFERENCES: Logier 1952, Wright and Wright 1949.

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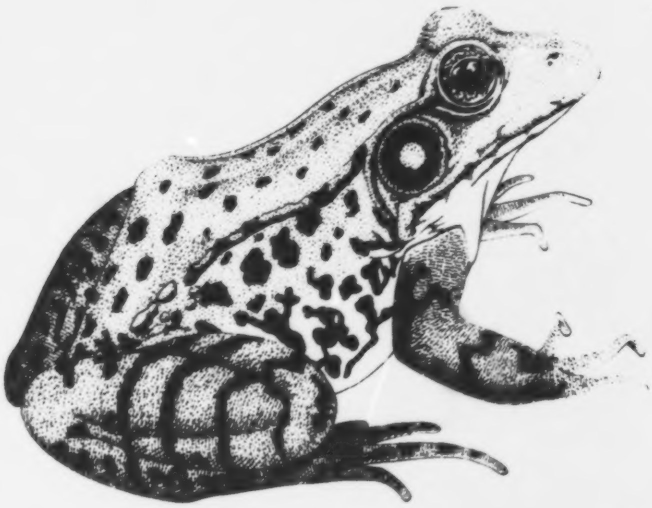
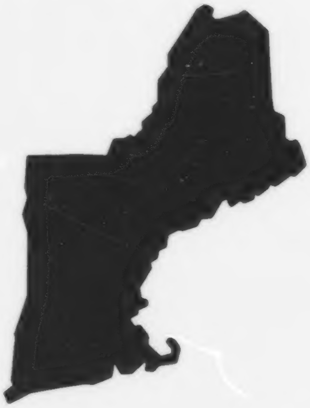
Green Frog

(Rana clamitans melanota)





RANGE: Nova Scotia through Quebec and s. Ontario to c. Minnesota, s. to e. Oklahoma and e. to n. Georgia and South Carolina. Absent from c. Illinois.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Riparian, inhabiting margins of shallow permanent or semipermanent fresh water, shores and banks of lakes and ponds, creeks, woodland streams, limestone quarry pools, springs, vernal pools, moist woodlands near water. Seldom more than a few meters from the water. Young often found in semipermanent water. Hibernates underground or underwater from October until March, usually within its home range (Martof 1953b). May be active on warm winter days.

SPECIAL HABITAT REQUIREMENT: Riparian areas.

AGE/SIZE AT SEXUAL MATURITY: Males sexually active the season following metamorphosis when 60 to 65 mm long; females mature during the second or third year when 65 to 75 mm long (Martof 1956). Some females reached maturity at 90 mm at Cranberry Lake, New York (M. Stewart, personal communication). Some may not breed until the second year after transformation (Wells 1977).

BREEDING PERIOD AND EGG DEPOSITION: April to August, peak in mid-May, varies with locality. The same female may lay two clutches (Wells 1976). Emerge from hibernation in early spring but do not breed until mid-May in Connecticut (Babbitt 1937).

NO. EGGS/MASS: 3,500 to 4,000 eggs (Wright 1914:16), to 5,000 (Pope 1944). Eggs deposited in floating masses of jelly attached to underwater twigs and stems in permanent water.

TIME TO HATCHING: 3 to 6 days (Babbitt 1937).

TADPOLES: 1 to 2 years. Less than 1 year in southern parts of range. May transform in same season eggs are laid (Martof 1956).

HOME RANGE/MOVEMENT: Ranged from 20 m^2 to 200 m^2 with an average of 61 m^2 in southern Michigan near a stream and lake; daily movements were less than 10 m for 80 percent of the 824 individuals recaptured (Martof 1953b). During breeding season, males maintained a 2 to 3 m distance between each other (Martof 1953a). Territory size depends on cover density, 1 to 1.5 m between males in areas of dense cover. Territories with diameters of 4 to 6 m defended in open areas in New York (Wells 1977).

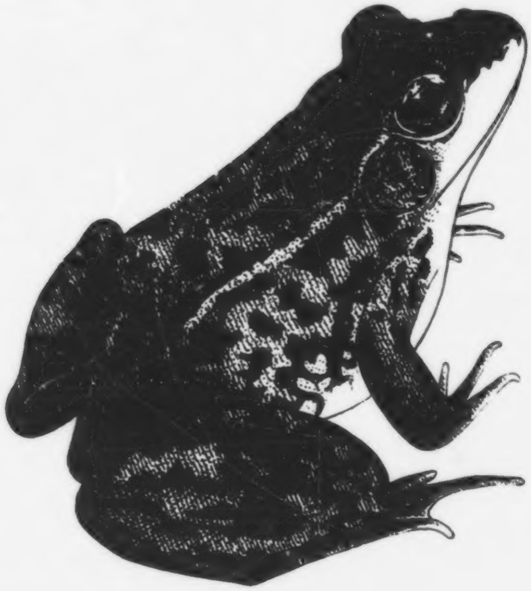
FOOD HABITS/PREFERENCES: Terrestrial feeders among shoreline vegetation. Insects and their larvae, worms, small fish, crayfish and other crustaceans, newts, spiders, small frogs, and mollusks are taken. Beetles, flies, grasshoppers, and caterpillars constituted over 60 percent of food items (Hamilton 1948). Terrestrial beetles are the most important food item (Steward and Sandison 1972). Tadpoles are herbivorous.

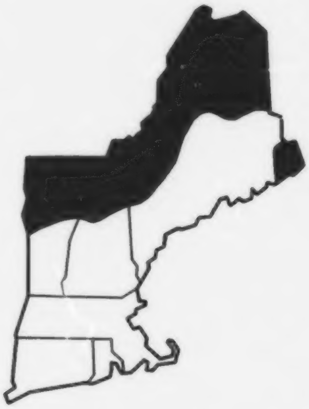
COMMENTS: Found in or at edge of water during daylight hours; evening hours spent along the banks feeding or in water defending territories (Wells 1977).

KEY REFERENCES: Logier 1952; Martof 1953b, 1956; Wright and Wright 1949.

Mink Frog

(Rana septentrionalis)





RANGE: Nova Scotia, n. New England and New York w. to n. Wisconsin and Minnesota, n. through Ontario to St. James Bay and to n. Quebec and Labrador.

RELATIVE ABUNDANCE IN NEW ENGLAND: Only in extreme northern areas, locally common to rare.

HABITAT: At the edges of northern lakes and ponds, cold springs, inlets where cold streams enter ponds and stream edges. Prefers open water with abundant lily pads. Sometimes found in northern bogs.

SPECIAL HABITAT REQUIREMENTS: Breeds and hibernates only in permanent waters. Prefers lily pads in open water for basking and foraging (M. Stewart, personal communication).

AGE/SIZE AT SEXUAL MATURITY: Males 1 year after metamorphosis, females 1 to 2 years after metamorphosis (Hedeen 1972).

BREEDING PERIOD AND EGG DEPOSITION: June to early August (Hedeen 1972), peak in July (Wright and Wright 1949:535).

NO. EGGS/MASS: One individual laid 509 eggs (Hedeen 1972). Eggs laid in globular jelly-like masses attached to aquatic vegetation such as spatterdock (*Nuphar*) then drop to bottom where they develop (M. Stewart, personal communication).

TIME TO HATCHING: Unreported.

TADPOLES: For 1 to 2 years. Transform during summer months.

HOME RANGE/MOVEMENT: Unreported.

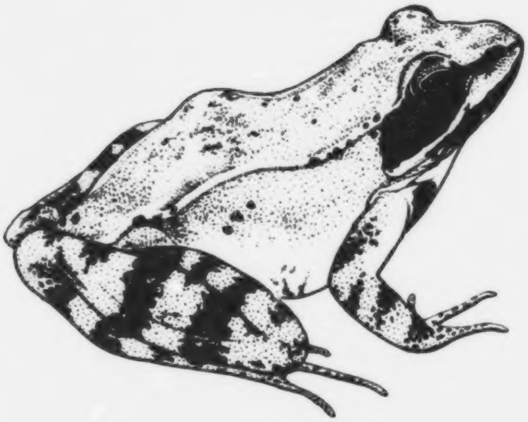
FOOD HABITS/PREFERENCES: Adults feed from lily pads on animal matter, including adult insects and larvae, particularly aphids and chrysomelids (Kramek 1972, 1976), also minnows, millipedes, leeches, snails, spiders; plant material taken inadvertently. Most prey taken from the water surface--usually opportunistic feeders, but can be selective (Kramek 1972). Diet [illegible] a reflection of prey species availability. Tadpoles feed primarily on algae (Hedeen 1970).

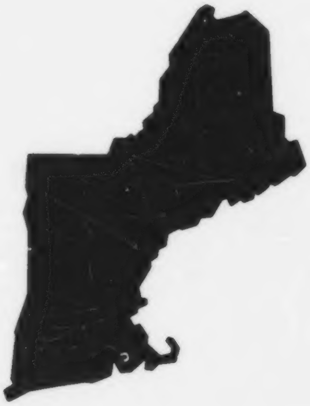
COMMENTS: Very similar to *R. clamitans melanota* in appearance and habits. Adults produce a musky scent, especially when handled roughly (Conant 1975:342). Competition from green frogs and bullfrogs may be an important factor in habitat selection in the Northeast (M. Stewart, personal communication). In ponds treated with rotenone in the Adirondacks, the anuran community of green, mink, and bullfrogs probably requires 10 to 15 years to recover to pretreatment levels (Stewart 1975).

KEY REFERENCES: Hedeen 1977, Logier 1952, Marshall and Buell 1955.

Wood Frog

(Rana sylvatica)





RANGE: Atlantic provinces and n. Quebec to Alaska (northern limit is along treeline) s. into North Dakota, the Great Lakes States, to the Appalachians in Tennessee and extreme n. Georgia. Throughout the Northeast.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in suitable habitat.

HABITAT: Terrestrial; in mesic woods, often far from water during the summer months as woodland ponds dry up; xeric woods with moist microhabitats (M. Klemens, personal communication). Prefers wooded areas with small ponds for breeding (Heatwole 1961). Found in boreal conifer forests, swamps and upland hardwood forests to elevations of 1,158 m, (Trapido and Clausen 1938). Found in bogs and trap rock slopes in Connecticut (M. Klemens, personal communication). Hibernates under moist forest floor debris or flooded meadows (M. Klemens, personal communication) from October to late March. Embryos and larvae showed limited tolerance to water with a high humic content in a Minnesota peat bog (Karns 1980).

SPECIAL HABITAT REQUIREMENTS: Prefers temporary woodland pools, back waters of slow-moving streams.

AGE/SIZE AT SEXUAL MATURITY: Males at 2 years, females at 3 years (Bellis 1961).

BREEDING PERIOD AND EGG DEPOSITION: March to July at temperatures of about 10°C (50°F) (Smith 1956:113). Moore (1939) found maximum temperature tolerance of 24°C (75°F) for egg development. Often breeds before ice is off the water (Martof 1970:86.2). Egg-laying usually completed within 4 to 6 days (Herreid and Kinney 1967).

NO. EGGS/MASS: 2,000 to 3,000 eggs (Wright 1914:16), 1,019 average in Massachusetts (Possardt 1974).[2] Eggs attached to submerged twigs or free on the bottom in globular masses.

TIME TO HATCHING: 10 to 30 days (Oliver 1955:236), temperature dependent.

TADPOLES: 6 to 15 weeks (Minton 1972:132). May overwinter in n. Canada.

HOME RANGE/MOVEMENT: Average home-range size for 453 individuals in a Minnesota peat bog was 77.2 square yards (65.5 m^2), range 3.5 to 440.5 square yards (2.9 to 368.3 m^2). Distance between captures averaged 12.3 yards (11.2 m) and ranged from 0 to 78 yards (0 to 71.3 m) as reported by Bellis (1965).

FOOD HABITS/PREFERENCES: Insects; particularly beetles, flies and hymenopterans (Moore and Strickland 1955), also spiders, snails, slugs, and annelids.

COMMENT: Breeds before all other ranids in the Northeast. Adults have been observed migrating across surface ice toward chorusing wood frogs (T. Andrews, personal observation). Brush piles, grassy hummocks, and other terrestrial objects used as cover rather than utilizing aquatic escape (Marshall and Buell 1955).

KEY REFERENCES: Heatwole 1961, Martof 1970, Wright and Wright 1949.

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[2] Possardt, E. E. The breeding biology and larual development of the wood frog *(Rana sylvatica)*. Dept. For. and Wildl. Manage., Univ. Mass., Amherst. Unpublished.

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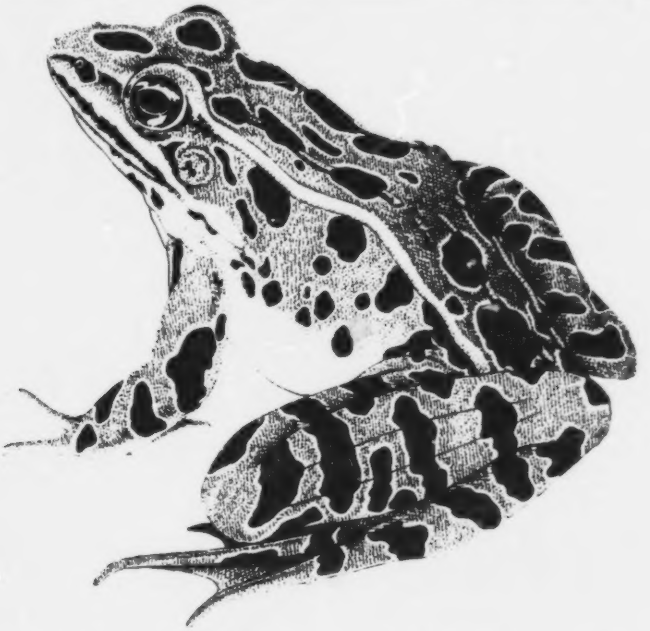
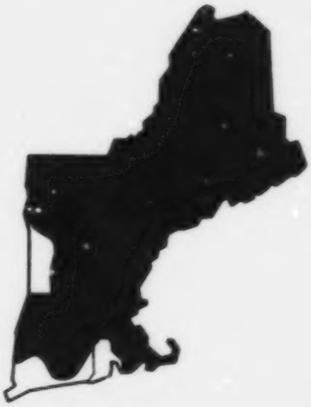
Northern Leopard Frog

(Rana pipiens)





RANGE: Nova Scotia, S. Labrador to se. British Columbia, to e. parts of Oregon, Washington and California, to n. Arizona and New Mexico, and to Ohio, n. New York and New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common; spotty distribution in southern part of range, very uncommon in parts of formerly occupied range.

HABITAT: Commonly found in wet open meadows and fields and wet woods during summer months. River floodplains, Connecticut (M. Klemens, personal communication). Breeds in ponds, marshes, slow shallow streams, and weedy lake shores. Usually hibernates from October or November to March, hibernates under water or in caves (Rand 1950). Sometimes emerges in early February (Smith 1956:110) and during warm days in winter (Zenisek 1964).

SPECIAL HABITAT REQUIREMENTS: Wet meadows.

AGE/SIZE AT SEXUAL MATURITY: At 3 years of age in Michigan (Force 1933).

BREEDING PERIOD AND EGG DEPOSITION: March to May, congregates to breed (Wright and Wright 1949:482).

NO. EGGS/MASS: 4,000 to 6,500 eggs laid in masses in shallow water, sometimes attached to twigs.

TIME TO HATCHING: 13 to 20 days (Wright 1914:58).

TADPOLES: 9 to 12 weeks, transform July and August. Overwinter as tadpoles in Nova Scotia (Bleakney 1952).

HOME RANGE/MOVEMENT: Daily travel within home range reported to be usually less than 5 to 10 m in wet pasture and marsh (Dole 1965). Average nightly movement during rainy periods was 36 m in Michigan (Dole 1968). Occasional long-range movement, often exceeding 100 m during rainy nights (Dole 1965).

FOOD HABITS/PREFERENCES: Insects; particularly beetles, lepidopteran larvae, wasps, bugs, crickets, grasshoppers, and ants; also takes sowbugs, spiders, small crayfish, snails, and myriopods. Almost 99 percent of foot items were insects and spiders (Drake 1914). Occasional records of having taken small birds and snakes. Food species taken correlates with peaks in insect prey abundance (Linzey 1967).

COMMENTS: During dry summer days frogs may sit in "forms," small clearings made in wet soil within their home range (Dole 1965). Most northeastern leopard frogs are probably introduced "exotics" released from laboratories and classrooms. Some believe the species is not native to New England (T. Tyning, personal communication).

KEY REFERENCES: Dole 1968, Logier 1952.

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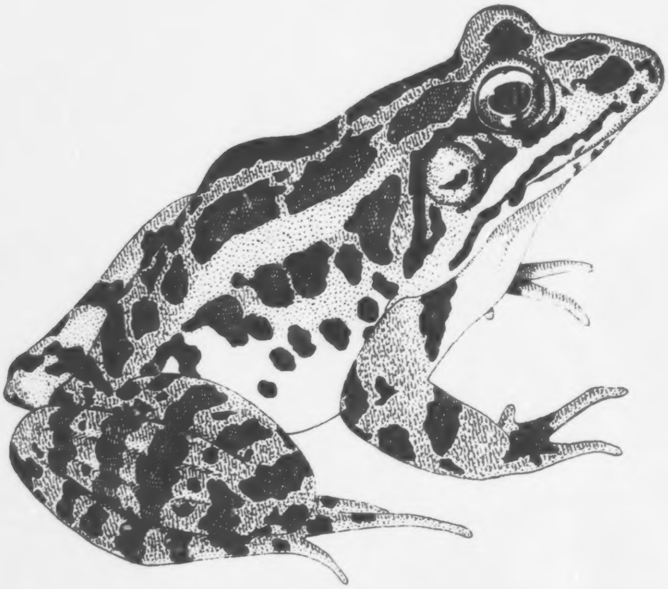
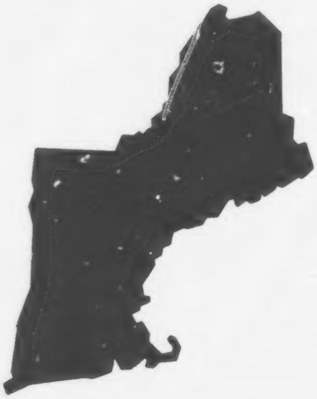
Pickerel Frog

(Rana palustris)





RANGE: Nova Scotia and the Gaspé Peninsula through se. Ontario to Wisconsin se. to e. Texas and ea. to South Carolina. Absent from C. Illinois, nw. Ohio and parts of the South.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Colder waters of lakes, ponds, clear streams, springs, sphagnum bogs, limestone quarry pools. In Massachusetts, fairly ubiquitous along streams and shores of permanent ponds and lakes (T. Andrews, personal communication). In summer found in pastures, fields, or woodlands, often at a distance from water. Prefers water with thick vegetation at edges for cover. Hibernates in mud at bottom of ponds or in ravines under stones from October to March. Some individuals found wintering in caves in Indiana (Rand 1950).

SPECIAL HABITAT REQUIREMENTS: Shallow, clear water of bogs and woodland ponds for breeding.

AGE SIZE AT SEXUAL MATURITY: Unreported.

BREEDING PERIOD AND EGG DEPOSITION: March to May.

NO. EGGS/MASS: 2,000 to 3,000 eggs (Wright 1914:67). Eggs laid in firm globular masses attached to submerged plants and branches.

TIME TO HATCHING: 11 to 21 days (Wright 1914:67).

TADPOLES: 80 to 100 days, some overwinter as tadpoles. Transform July to September.

HOME RANGE MOVEMENT: Unreported.

FOOD HABITS PREFERENCES: In adults, 95 percent of food items were terrestrial arthropods (Smith 1956:108). Snails, small crayfish, aquatic amphipods and isopods are also eaten.

COMMENTS: Diurnal; may be crepuscular during hot weather. Sensitive to pollution and changes in water quality. Skin secretions may be toxic to other amphibians confined with pickerel frogs.

KEY REFERENCES: Schaaf and Smith 1971, Smith 1956, Wright and Wright 1949.

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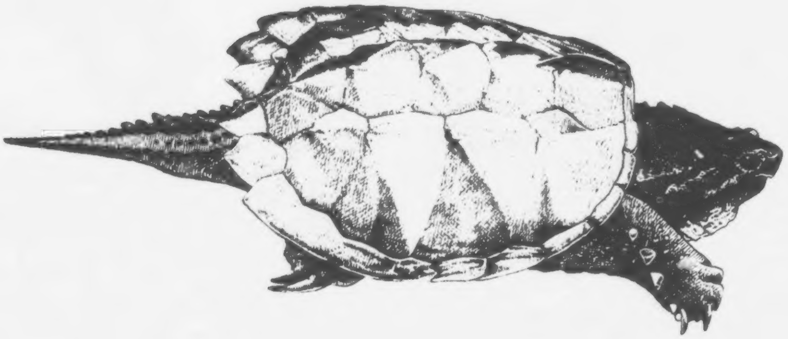
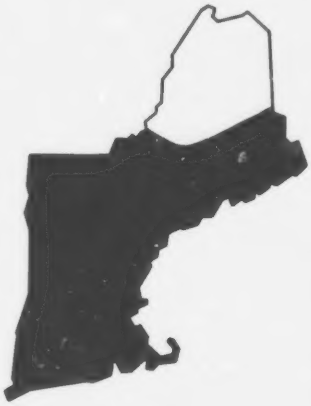
Common Snapping Turtle

(Chelydra s. serpentina)





RANGE: Across the Eastern United States to the Rocky Mountains, s. Canada to the Gulf of Mexico and into Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Bottom dweller in any permanent and many semipermanent bodies of fresh or brackish water; occasionally in temporary water. Marshes, swamps, bogs, pools, lakes, streams, rivers, frequently in areas with soft muddy banks or bottoms. Formerly thought to prefer permanent water. Almost entirely aquatic, but will travel overland. Hibernates from October to March or April in mud or debris in lake bottoms, banks, and muskrat holes, but has been seen walking on and under the ice (Carr 1952:64). Little known about winter activity.

SPECIAL HABITAT REQUIREMENTS: Aquatic habitat.

AGE/SIZE AT SEXUAL MATURITY: Carapace length of 10 inches (25.4 cm) reported by Hammer (1969).

BREEDING PERIOD: Late April to November, sperm may remain viable in females for several years.

EGG DEPOSITION: Mid-June. Nests made in soil of banks or in muskrat houses. Also on lawns, driveways, fields, sometimes far from water.

CLUTCH SIZE: 11 to 83 eggs; females may lay two clutches per year in southern portions of range. Typcially 20 to 30 eggs per clutch (Cahn 1937, cited in Conant 1938:128).

INCUBATION PERIOD: 55 to 125 days (Hammer 1969), typically 80 to 91 days, depending on environmental conditions.

EGGS HATCH: Late August to early October, may overwinter in nest until spring in northern portions of range. Nests often destroyed by mammalian predators.

HOME RANGE/MOVEMENT: Average distance traveled by 107 individuals was 0.69 mile (1.1 km), with most movement within the same marsh in South Dakota (Hammer 1969). In a New York marsh, movement of 100 m was the average for 85 individuals; home ranges from 3 to 9 ha (Kiviat 1980). Established range in Pennsylvania 4.5 acres (1.8 ha), reported by Ernst (1968b). Quite migratory. Females exhibit strong nesting site fidelity and will travel more than 0.5 km overland through forest and uneven terrain between water bodies in Ontario. Maximum round-trip distance of 16 km between home range and nesting site (Obbard and Brooks 1980).

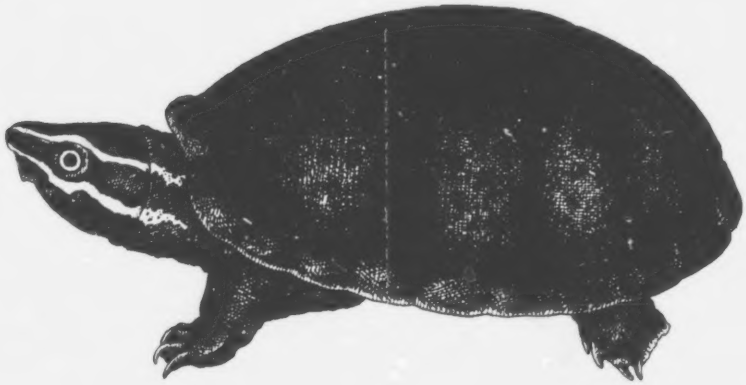
FOOD HABITS/PREFERENCES: Omnivorous feeders; animal matter accounts for 54 percent of prey items including fish (40 percent), crayfish, aquatic invertebrates, reptiles, birds, mammals; plant material 37 percent (Alexander 1943). Primary fish species in diet included suckers, bullheads, sunfish, and perch in Connecticut (Alexander 1943). May occasionally take young waterfowl; not destructive to natural population of fish or waterfowl. Scavenges for any food readily available.

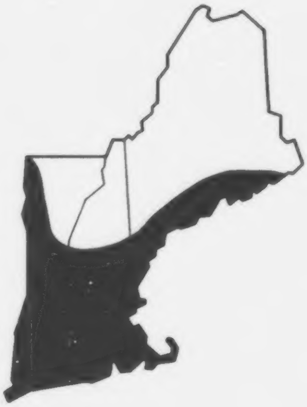
COMMENTS: High levels of persistent organochlorine contaminants found in the tissues of Hudson River Specimens (Stone et al. 1980).

KEY REFERENCES: Babcock 1919, Hammer 1969, Kiviat 1980.

Stinkpot

(Sternotherus odoratus)





RANGE: Atlantic coast, s. Ontario, w. to the Mississippi River, s. to c. Texas, s. Florida. Absent from n. New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Permanent bodies of water: still, shallow, clear lakes, ponds, and rivers, muddy bottoms preferred. Frequently found in reservoirs (M. Klemens, personal communication). Refrains from using temporary water sources. Formerly thought to refrain from using water with fluctuating levels. Not in streams at higher elevations in the East. Large populations found in areas with abundant aquatic vegetation (Pope 1939:39). Scattered records for occurrence in marshes, swamps, bogs, sloughs (Pope 1939:39). Usually gregarious when hibernating in bottom mud, debris, beneath rocks in river bottoms, or in river banks when the temperature falls below 10°C (50°F) (Cagle 1942).

SPECIAL HABITAT REQUIREMENTS: Permanent water bodies. Exclusively aquatic except when laying eggs.

AGE/SIZE AT SEXUAL MATURITY: Stinkpots in the northern portions of the range mature more slowly than individuals in the southern regions. Males at 3 or 4 years, females at 2 to 7 years (Tinkle 1961), or perhaps at 9 to 11 years (Risely 1932).

BREEDING PERIOD: April to October, peak in April to May, September to October.

EGG DEPOSITION: May to August, peak in June. Eggs laid in muck, rotted logs, stumps, sandy soil, grass, or on the ground at lake margins.

CLUTCH SIZE: 1 to 9 eggs (highest numbers in North), typically 3 to 6.

INCUBATION PERIOD: 60 to 90 days (Barbour 1971:162), 35 to 40 days (Edgren 1960).

EGG HATCH: September to October (in North). Gregarious nesting habits, often malodorous.

HOME RANGE/MOVEMENT: Overland movements probably seasonal or forced (Ernst and Barbour 1972:40). Average home range is 0.06 acre (0.02 ha) for males and 0.12 acre (0.05 ha) for females in Oklahoma. Overland movements ranged from 166 to 227 feet (35.4 to 69.2 m) for males, and 113 to 146 feet (34.4 to 44.5 m) for females (Mahmoud 1969). Exhibited homing behavior in Michigan—13 out of 28 released individuals traveled up to 700 feet (213 m) to initial capture points (Williams 1952).

FOOD HABITS/PREFERENCES: Principally carnivorous, feeds along the bottom for snails, clams, aquatic insects and their larvae, particularly dragonfly nymphs and caddisfly larvae (Lagler 1943), minnows, worms, tadpoles, and fish eggs (Babcock 1919:36). While scavenging, plants and algae as well as carrion are eaten. Carrion accounted for 40 percent of the diet by volume for 73 individuals in Michigan (Lagler 1943).

COMMENTS: Also called the musk turtle. Often basks well out of water on horizontal limbs of slanting trees along the water's edge. Highly aquatic; activity periods in morning and evening in Oklahoma (Mahmoud 1968). Individuals frequently covered with algae growth.

KEY REFERENCES: Ernst and Barbour 1972, Mahmoud 1969.

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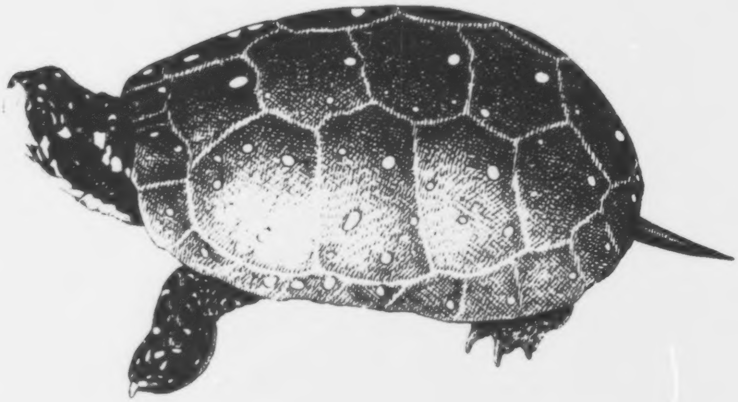
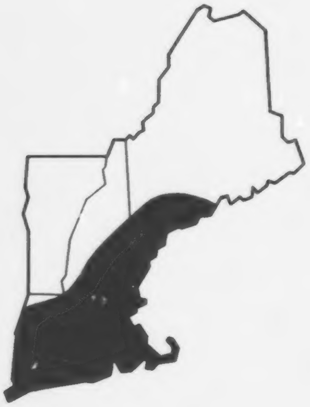
Spotted Turtle

(Clemmys guttata)





RANGE: Southern Marine to s. Quebec w. to Lake Michigan, n. half of Ohio to e. portion of Virginia s. to n. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: In unpolluted, small shallow bodies of water such as woodland streams, wet meadows, bog holes, small ponds, marshes, swamps, roadside ditches, and brackish tidal creeks. In Rhode Island, found in salt marshes and small bogs or ponds with adjacent dry upland oak-pine forest (C. Raithel, personal communication). Prefers areas with aquatic vegetation. Hides in mud and detritus at bottom. Wanders over land. Basks along water's edge on brush piles in water (T. Graham, personal communication) and on logs or vegetation clumps. Often found in cranberry bogs. Hibernates in muddy bottoms during the coldest winter months. May aestivate during hottest periods of summer (T. Tyning, personal communication).

SPECIAL HABITAT REQUIREMENTS: Unpolluted shallow water.

AGE/SIZE AT SEXUAL MATURITY: Males about 83.4 mm plastron length, females about 80.8 mm plastron length in Pennsylvania (Ernst and Barbour 1972:73).

BREEDING PERIOD: March to May, peak usually June.

EGG DEPOSITION: June to July. Eggs usually laid in well-drained soil of marshy pastures, or in tussocks (M. Klemens, personal communication).

CLUTCH SIZE: 1 to 8 eggs (Adler 1961), average 3 to 5.

INCUBATION PERIOD: 70 to 83 days.

EGGS HATCH: Late August (Ernst and Barbour 1972:74) to September (Finneran 1948). Overwintering in nest may occur.

HOME RANGE/MOVEMENT: For adults in Pennsylvania marsh range averaged 1.3 acre (0.5 ha) according to Ernst (1968b); moved less than 0.5 mile (0.8 km) (Ernst 1968a). Females migrate outside of home range to nest (Ernst 1970).

FOOD HABITS/PREFERENCES: Omnivorous. Eats crustaceans, mollusks, spiders, earthworms, aquatic insects, and other invertebrates; occasionally takes frogs and tadpoles, small fish, carrion, and vegetable matter. Food taken only under water.

COMMENTS: Overcollecting, coupled with draining and filling of swamps (and possibly pollution), is depleting the population. A strongly diurnal species (Graham and Hutchinson 1979).

KEY REFERENCES: Ernst 1972a, Ernst and Barbour 1972, Stewart 1974.

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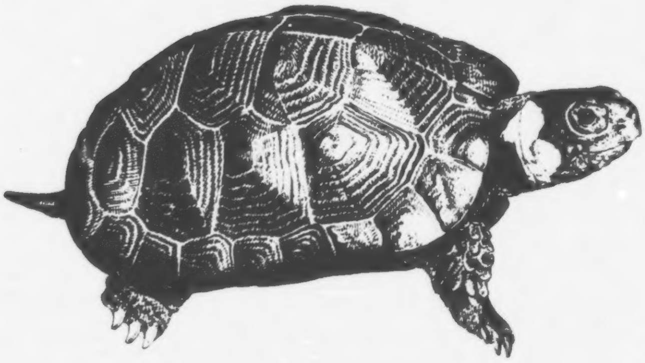
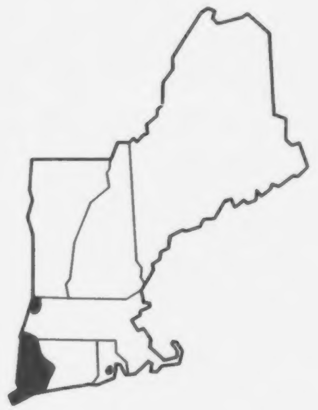
Bog Turtle

(Clemmys muhlenbergii)





RANGE: Scattered colonies through New York, s. to ne. Maryland, s. Virginia, w. North Carolina and Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Endangered (U.S. Department of Interior 1980).

HABITAT: Unpolluted open sphagnum bogs or wet meadows; sluggish clear meadow streams with muddy or mucky bottoms (Zappalorti et al. 1979).[3] Frequents shallow meandering waterways in swamps and wet meadows. In Connecticut, associated with open canopy and calcareous wetlands (M. Klemens, personal communication). Hibernates midautumn to late March or April. Hibernaculum is in a subterranean rivulet or seepage area with continually flowing water in New Jersey (Zappalorti and Farrell 1980).[4] Commonly basks in spring and early summer. In New Jersey bogs, individuals found basking on sedge grass tussocks or in open shallow pools (Zappalorti et al. 1979).

SPECIAL HABITAT REQUIREMENTS: Abundance of grassy or mossy cover, high humidity, and full sunlight.

AGE/SIZE AT SEXUAL MATURITY: At 5 years and plastron length of 75 mm (Barton and Price 1955). From 6 to 8 years, at plastral length of 70 mm (Ernst 1977).

BREEDING PERIOD: Late April to early June.

EGG DEPOSITION: June to July, often in tussocks or on top of sphagnum in open, sunny areas on bogs (Zappalorti et al. 1979).

CLUTCH SIZE: 2 to 5, typically 2 to 3 (Zappalorti et al. 1979).

INCUBATION PERIOD: 7 to 8 weeks (Nemuras 1969).

EGGS HATCH: July to early September (Ernst and Barbour 1972:77-78). In northern locations, hatchlings may overwinter in the nest.

HOME RANGE/MOVEMENT: Average range was 1.28 ha for 19 individuals in Lancaster County, Pennsylvania (Ernst 1977). Ranging from 0.008 to 0.943 ha, traveling through wet runs (Barton 1957, cited in Ernst 1977:246). Average movement was 12 m between recaptures for a male; when displaced, the same individual moved 0.4 km in 1 day returning to initial point of capture (Ernst and Barbour 1972:79).

FOOD HABITS/PREFERENCES: Omnivorous. Eats berries (20 percent), insects (80 percent), (Surface 1908:158), also slugs, earthworms, crayfish, frogs, snakes, nestling birds, seeds of pondweeds and sedges, snails, carrion; availability determines food consumption (Barton and Price 1955). Forages on land and under water.

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[3] Zappalorti, R. T.; Farrell, R. F.; Zanelli, E. M. 1979. The ecology and distribution of the bog turtle, *Clemmys muhlenbergii* (Schoepff), in New Jersey, Pt. 2. Report to the New Jersey Dept. of Environ. Protection, Endangered and Nongame Spec. Proj., Federal Aid Prog. and Herpetological Associates. HA Rept. No. 79.02, Vol. 1, 38 pp. Unpublished.

[4] Zappalorti, R. T.; Farrell, R. F. 1980. An ecological study of the bog turtle, *Clemmys muhlengergii*, Schoepff (Reptilia, Testudines, Emydidae), in New Jersey, Pt. 3. Report to the New Jersey Dept. of Environ. Protection, Endangered and Nongame Spec. Proj., Federal Aid Prog. and Herpetological Associates. HA Rept. No. 80.01. Unpublished.

Bog Turtle (Continued)

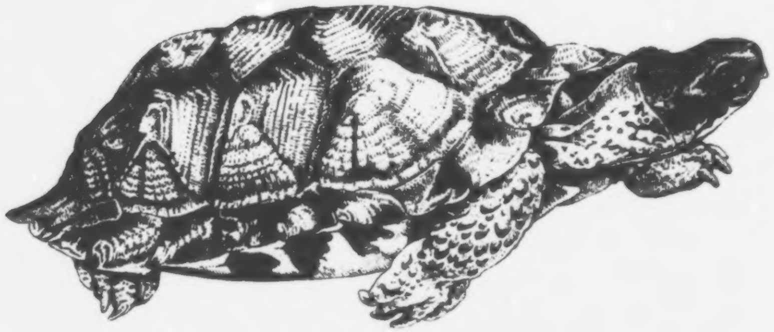
(Clemmys muhlenbergii)

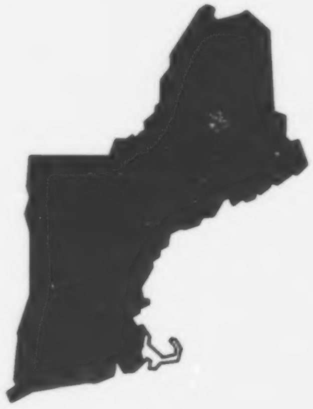
COMMENTS: Formerly named Muhlenberg's turtle. May aestivate during dry summer months (Ernst and Barbour 1972:77). Seldom active during the hottest part of the day (Zappalorti and Farrell 1980). Overcollection of this species is a problem, and locality information should be reported with discretion to prevent exploitation. Formerly abundant; population decreases related to wetland drainage and fill.

KEY REFERENCES: Barton and Price 1955, Bury 1979, Ernst and Bury 1977, Zappalorti et al. 1979, Zappalorti and Farrell 1980.

Wood Turtle

(Clemmys insculpta)





RANGE: Nova Scotia w. through the Great Lakes region to e. Minnesota. In the East extending s. to n. Virginia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Once common, population declining.

HABITAT: Frequents slow-moving meandering streams with sandy bottoms and overhanging alders (T. Graham, personal communication). Basks during morning hours along banks of streams. Disperses from water sources during summer months to fields, woods, and roadsides. Restricted to hardwood forest areas in New Jersey (Farrell and Zappalorti 1979);[5] pine barrens area, Rhode Island (Tucker, personal observation).

Returns in fall to streams to hibernate in muddy banks and bottoms through late March to April. Have been found hibernating in holes in stream banks (T. Graham, personal communication), in decaying vegetation of woods and trout streams with deep pools (M. Klemens, personal communication). Will also use abandoned muskrat burrows; some use same hibernaculum each year (Farrell and Zappalorti 1979).

SPECIAL HABITAT REQUIREMENTS: Wooded river banks; open sandy nesting areas.

AGE/SIZE AT SEXUAL MATURITY: Seems to vary geographically and between individuals. In New Jersey, specimens at 165 mm carapace length, aged between 7 and 8 years were thought to be sexually mature (Harding and Bloomer 1979). About 10 years and 160 mm carapace length in Michigan (Harding 1977).

BREEDING PERIOD: March, May, October (Ernst and Barbour 1972:82), when stream temperature reaches about 15°C (59°F) (Farrell and Zappalorti 1979).[6] Mating occurs in shallow water.

EGG DEPOSITION: May to June. Eggs laid in prepared depressions in open areas with sandy soils or gravel, not necessarily near water.

CLUTCH SIZE: 4 to 12 eggs (Carr 1952:122), averages 8 to 9 (Farrell and Zappalorti 1979) 5 to 18 in Michigan (Harding 1977).

INCUBATION PERIOD: 77 days (Allen 1955); 58 to 69 days in laboratory (Farrell and Zappalorti 1980).

EGGS HATCH: August to October. Hatchlings may overwinter in the nest in northern parts of range.

HOME RANGE/MOVEMENT: One male moved an average of 90 mm for three recaptures, one female was found 15 m from initial capture point (Ernst and Barbour 1972:83). Exhibited fidelity to a particular stream or brook in New Jersey (Farrell and Zappalorti 1979), and Pennsylvania (Strang 1983); mean home range was 447 m for 10 individuals in lowland forest.

FOOD HABITS/PREFERENCES: Omnivorous. Eats young vegetation, grass, moss, mushrooms, berries, insects and their larvae, worms, slugs, snails (Surface 1908:161-162); also carrion, tadpoles, frogs, and fish. Feeds in water or on land.

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[5] Farrell, R. F.; Zappalorti, R. T. The ecology and distribution of the wood turtle, *Clemmys insculpta* (LeConte), New Jersey, Pt. 1. (Preliminary report on a research contract between the New Jersey Dept. of Environ. Protection, Endangered and Nongame Species Proj., Nat. Audubon Soc. and Herpetological associates No. 79.03.) Unpublished.

[6] Farrell, R. F.; Zappalorti, R. T. An ecological study of the wood turtle, *Clemmys insculpta* (LeConte), (Reptilia, Testudines, Emydidae) in northern New Jersey, Pt. 2. (Report to the New Jersey Dept. of Environ. Protection, Endangered and Nongame Species Proj., Herpetological Assoc. Rep. No. 80.02.) Unpublished.

Wood Turtle (Continued)

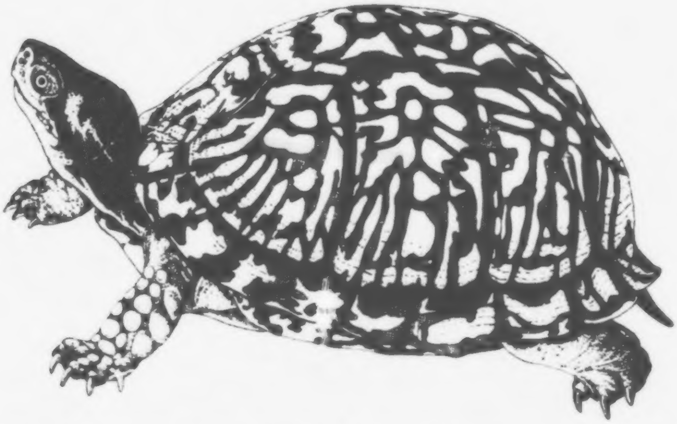
(Clemmys insculpta)

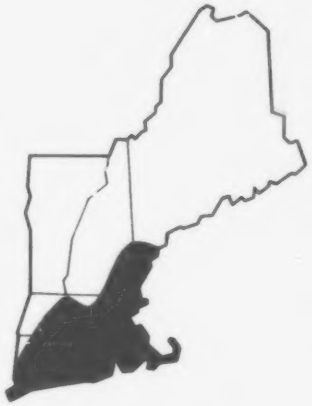
COMMENTS: Formerly thought to be one of the most terrestrial turtles, actually found equally in water and on land. Lives in large groups or colonies (Farrell and Zappalorti 1979). Diurnal. Development of wooded river banks and widespread commercial collection are factors contributing to population decline. Not tolerant of pollution. Young not often encountered.

KEY REFERENCES: Ernst 1972b, Farrell and Zappalorti 1979.

Eastern Box Turtle

(Terrapene c. carolina)





RANGE: Southeastern Maine and the Thousand Island region of New York w. to the Mississippi River, c. Illinois and s. to n. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common, more abundant farther south; declining in many areas.

HABITAT: Woodlands, field edges, thickets, marshes, bogs, stream banks; typically found in well-drained forest bottomland (Stickel 1950). Young semiaquatic. Has been observed swimming in slow-moving streams and ponds. Found chiefly in open deciduous forests (N. Green, personal observation). Also found on mountain slopes in Massachusetts (T. Tyning, personal communication). During hot dry weather may rest in mud or water or burrow under logs or decaying vegetation for extended periods. When not active, rests in brush piles and thickets. Hibernates from depths of several inches to 2 feet (0.6 m) below surface in loose soil, decaying vegetation, mud, or in stream banks from late fall to April.

SPECIAL HABITAT REQUIREMENTS: Old fields, powerline clearings, ecotones with sandy soils favored (M. Klemens, personal communication).

AGE/SIZE AT SEXUAL MATURITY: 4 to 5 years in Kentucky, (Ernst and Barbour 1972:43), 5 to 10 years in Indiana (Minton 1972:165).

BREEDING PERIOD: After emerging from hibernation in April, sometimes continuing to fall. Females may lay viable eggs for up to 4 years after mating (Ewing 1943).

EGG DEPOSITION: June to July in the Northeast. Females often seen crossing roads in Massachusetts and New Jersey during nesting season (T. Graham, personal communication).

CLUTCH SIZE: 3 to 8 eggs, average 4 to 5.

INCUBATION PERIOD: 87 to 89 days (Allard 1935, cited in Carr 1952:146).

EGGS HATCH: August to September, hatchlings may overwinter in nest.

HOME RANGE MOVEMENT: From 150 to 750 feet (45.7 to 228.4 m); 12 individuals averaged movement of 390 feet (118.8 m) on Long Island (Breder 1927). For 62 individuals in mixed woodlands and open habitat on Long Island, average range was less than 750 feet (228.4 m) as reported by Nichols (1939). Stickel (1950) reported average diameter of 350 feet (106.6 m) in Maryland. One individual was found within 0.25 miles (0.4 km) from point of release 60 years previously (Allen 1868, cited in Babcock 1919:412). Maintains same home range for many years, occasionally leaves normal home range for random wandering or egg laying (Stickel 1950). Homing instinct displayed by 45 out of 60 turtles (Nichols 1939).

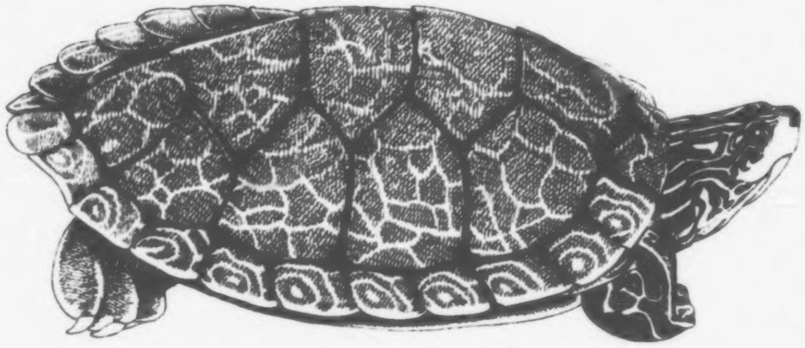
FOOD HABITS PREFERENCES: Younger individuals chiefly carnivorous, older individuals more herbivorous. Food items include animals such as earthworms, slugs, snails, insects and their larvae, particularly grasshoppers, moths and beetles; crayfish, frogs, toads, snakes, and carrion; vegetable matter such as leaves, grass, bugs, berries, fruits and fungi.

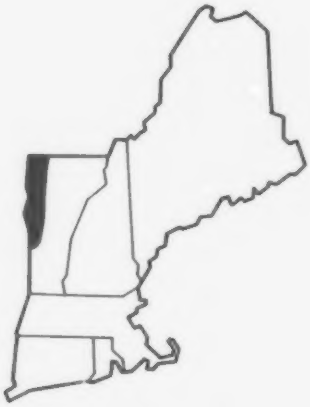
COMMENTS: Terrestrial and diurnal. Digs into leaf litter toward end of day. Bisection of habitat by roads can reduce or destroy populations. The reversion of much agricultural land to woodland may be a beneficial change to populations (M. Klemens, personal communication). Estimated age at full growth is 20 years. May live 60 to 80 years (Nichols 1939). Some individuals may live more than 100 years (Graham and Hutchinson 1969).

KEY REFERENCES: Carr 1952, Ernst and Barbour 1972, Stickel 1950.

Map Turtle

(Graptemys geographica)





RANGE: Lake Champlain to the Greak Lakes w. to the Mississippi drainage to e. Minnesota, s. to Louisiana and nw. Georgia. Along Susquehanna drainage. Introduced to Delaware River. Nests as far south as Poughkeepsie, Dutchess County, New York.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon and of limited distribution.

HABITAT: Aquatic, inhabiting rivers and lakes. Prefers large bodies of water with soft bottoms and aquatic vegetation. Hibernates in mud of shallow water from late fall to early spring. May be active on or under ice. Gregariously basks on logs or rocks or along beaches and grassy shores. In Michigan, found in riffles of pebble-bottom streams that have interspersed, deeper, muddier pools (M. Kiemens, personnel communication). Move from shallow bays to nesting areas and reenter bays to overwinter in Quebec (Gordon 1980).

SPECIAL HABIT REQUIREMENTS: Water bodies with muddy or soft bottom substrate.

AGE/SIZE AT SEXUAL MATURITY: Females at 7.5 inches (190.5 mm) and larger (Newman 1906, cited in Pope 1939:169).

BREEDING PERIOD: April and autumn (Ernst and Barbour 1972:110).

EGG DEPOSITION: May to July, peak mid-June. Nesting season begins in mid-June in Quebec and averages 2 weeks in duration (Gordon 1980). Nests made in soft sand or soil away from beaches.

CLUTCH SIZE: 10 to 16 eggs (Cahn 1937), typically 12 to 14 eggs. More than one clutch may be laid.

EGGS HATCH: Late August to early September (Carr 1952:199), some may overwinter in the nest.

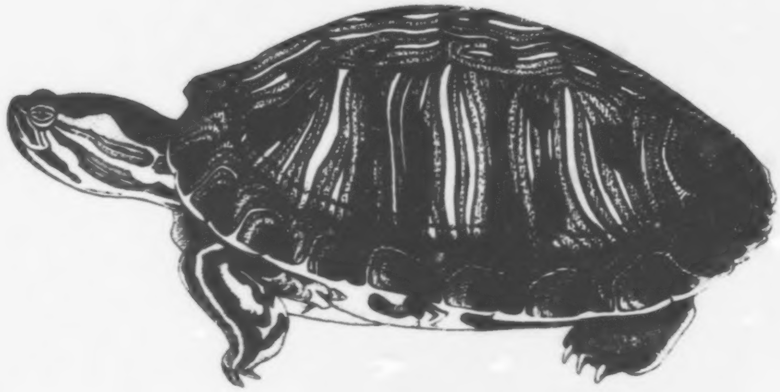
HOME RANGE/MOVEMENT: Unreported.

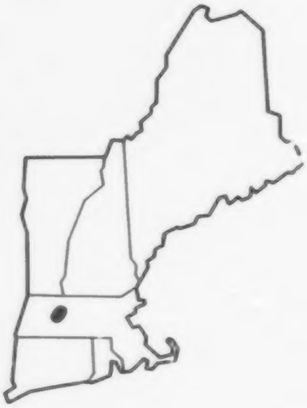
FOOD HABITS/PREFERENCES: Aquatic feeders—snails and clams are the major components of the diet; other small mollusks, crayfish, vegetable matter, fish, insects, and carrion are eaten (Carr (1952: 199).

KEY REFERENCES: Evermann and Clarke 1916, Newman 1906.

Red-eared Slider

(Pseudemys scripta elegans)





RANGE: Central Ohio w. to se. Iowa, s. into New Mexico, Texas, Alabama and w. Tennessee. Feral in parts of the Northeast.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Ponds, shallow areas of lakes, creeks and drainage ditches. Hibernates when water temperature drops below 10°C (50°F). Sometimes occupies muskrat burrows or hollow stumps.

SPECIAL HABITAT REQUIREMENTS: Quiet water with muddy bottom, abundant vegetation, projecting substrate, such as logs or rocks for basking.

AGE/SIZE AT SEXUAL MATURITY: Plastron length for males 90 to 100 mm, for females 150 to 195 mm.

BREEDING PERIOD: Unreported.

EGG DEPOSITION: April to mid-July. Females may be capable of reproducing for 40 to 50 years. Average longevity may be 50 to 75 years (Cagle 1950). Female excavates nest hole in earth, deposits eggs and seals hole with mud and debris. May move a mile (1.6 km) from water to find suitable nest site.

CLUTCH SIZE: 2 to 22, typically 5 to 10. 1 to 3 clutches per season.

INCUBATION PERIOD: 68 to 70 days *(Pseudemys scripta troostii* incubated in laboratory, Cagle 1950).

EGGS HATCH: July 1 to mid-September (Illinois and Louisiana).

HOME RANGE/MOVEMENT: Most sliders (n = 1,006) inhabiting a drainage ditch in Mississippi River floodplain remained within one-half mile (0.8 km) of release site (Cagle 1944:24).

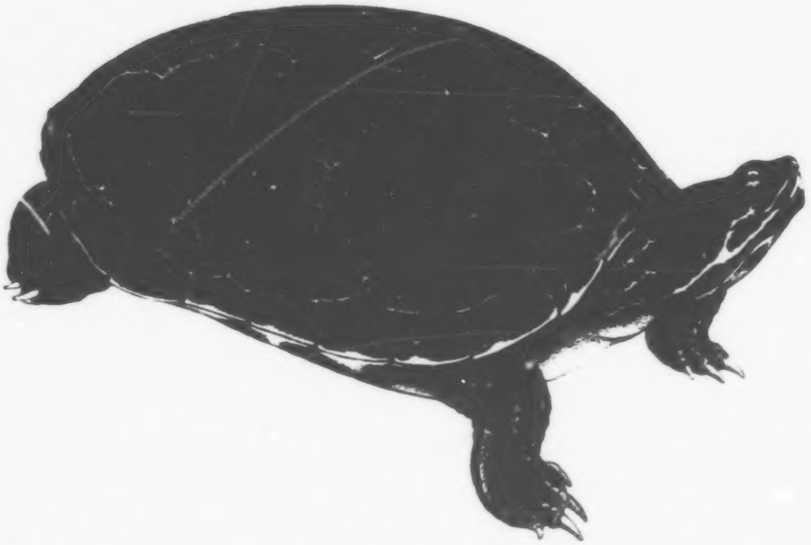
FOOD HABITS/PREFERENCES: Omnivorous. Take tadpoles, crayfish, mollusks, large larvae of aquatic insects, small fish (Cahn 1937).

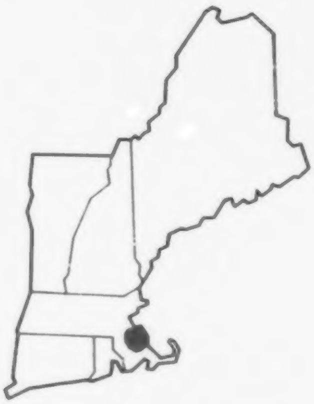
COMMENTS: Possibly feral in Maryland (Cooper 1959). Active from late April until October in Illinois. Highly aquatic, avoids land except when laying eggs. Aestivates in mud when temperatures exceed 31°C (89°F) (Cagle 1950).

KEY REFERENCES: Cagle 1950, Cahn 1937, Cooper 1959, Webb 1961.

Plymouth Redbelly Turtle

(Pseudemys rubriventris bangsi)





Range: Plymouth County, Massachusetts. Recently, skeletal remains and a shell found in Ipswich, Essex County, Massachusetts (Graham 1982).

Relative Abundance in New England: Endangered (federal list).

Habitat: Ponds of different sizes in Plymouth County. Frequents shallow coves (Graham 1971a).

Special Habitat Requirements: Muddy-bottomed shallows with abundant aquatic vegetation, especially milfoil (*Myriophyllum*) and bladderwort (*Utricularia*) (Graham 1980).

Age/Size at Sexual Maturity: Probably not reached during first 9 years (Graham 1971a). Average life span estimated at 40 to 55 years (Graham 1980).

Breeding Period: Probably early spring and fall (T. Graham, personal communication).

Egg Deposition: Mid-June to early July. Prefer to nest in disturbed sites (T. Graham, personal communication).

Clutch Size: Range 12 to 17 eggs — average 14.5 (T. Graham, personal communication).

Eggs Hatch: Probably September, fall (T. Graham, personal communication), July if they overwinter. Average hatching time of 75 days for 17 eggs incubated in a laboratory at 29°C (84°F) (Graham 1971b). If hatchlings overwinter, emerge during the following July.

Home Range/Movement: Unknown but wanders on land especially during fall and late spring. Found 0.5 to 2.0 miles (0.8 to 3.2 km) from water on occasion. Significance of wandering unknown (T. Graham, personal communication).

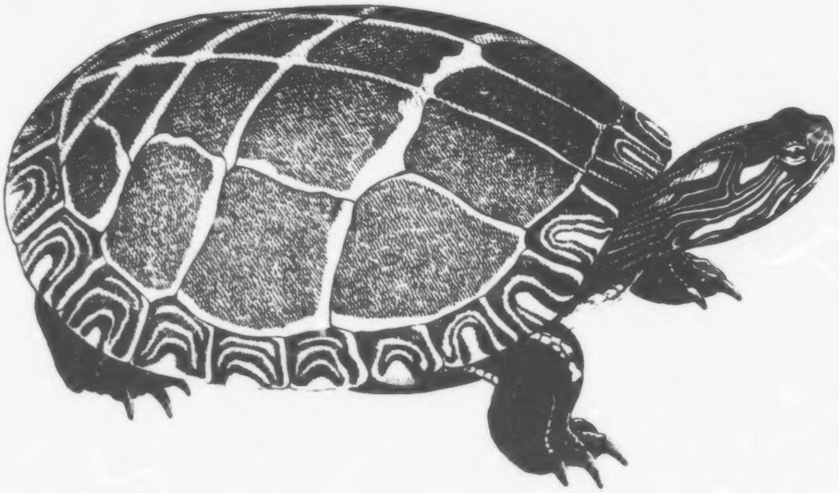
Food Habits/Preferences: Primarily herbivorous, feeding mainly on milfoil, also feeds on bladderwort (Graham 1980) and arrowhead (*Sagittaria*) (Graham 1971a). Dietary shift to crayfish in fourth season (Graham 1971a).

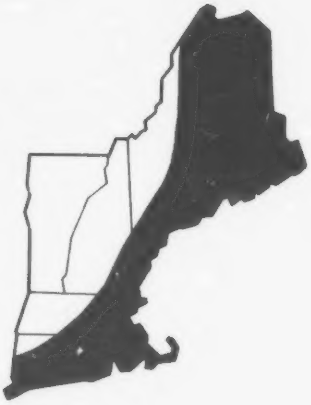
Comments: Basks during early morning hours on elevated sites or in water by floating or resting on weed mats (Graham 1980). Discovered in Plymouth, Massachusetts in 1869 (Lucas 1916). Population estimate about 200 to 300 in Plymouth County (T. Graham, personal communication).

Key References: Graham 1971a, 1971b, 1980; Lazell 1976.

Eastern Painted Turtle

(Chrysemys p. picta)





RANGE: Nova Scotia to ne. New York, to Cape Hatteras and inland to e. Alabama. In the Northeast merges with range of the Midland painted turtle.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common, often abundant.

HABITAT: Quiet, shallow ponds, marshes, woodland pools, rivers, lake shores, wet meadows, bogs, and slow-moving streams. Sometimes in brackish tidal waters, salt marshes (Pope 1939:183). Stagnant and polluted waters are sometimes inhabited (Smith 1956:150). When in water, usually remains in submerged vegetation. Basks on small hummocks, logs, rocks, sometimes congregating in large groups. Hibernates by burrowing into mud or decayed vegetation of pond bottoms.

SPECIAL HABITAT REQUIREMENTS: Aquatic habitat.

AGE/SIZE AT SEXUAL MATURITY: Correlated with size, in Michigan males exceeded 81 mm plastron length, females ranged from 110 to 120 mm (Gibbons 1968a).

BREEDING PERIOD: March to mid-June and fall (Gibbons 1968a). Peak in April in Connecticut (Carr 1952:218).

EGG DEPOSITION: May to July. Nest sites within a few yards of water (Cahn 1937, cited in Smith 1961:140), or up to one-half mile away (T. Tyning, personal communication).

CLUTCH SIZE: 2 to 11 eggs, females may lay 2 clutches (Gibbons 1968a), typically 5 to 6 eggs.

INCUBATION PERIOD: 72 to 80 days (Ernst and Barbour 1972:143). 63 days (Lynn and vonBrand 1945). Hatchlings from late clutches may overwinter in the nest. Nests are often destroyed by raccoons and skunks.

EGGS HATCH: Late August to early September, in Connecticut (Finneran 1948).

HOME RANGE/MOVEMENT: Displays short-distance homing ability; fewer than 15 percent moved more than 100 m in a marsh in Michigan (Gibbons 1968a). Average distance traveled was 112 m in a shallow bay of a Wisconsin lake; 70 percent of the turtles did not travel. Individuals may remain in the same locality for years if conditions are favorable (Pearse 1923).

FOOD HABITS/PREFERENCES: Aquatic insects, snails, small fish, tadpoles, mussels, carrion, and aquatic plants taken by foraging along the bottom. Diet usually about 50 percent vegetation.

COMMENTS: Diurnal. Emerges from hibernation in late March or early April in Massachusetts (Graham 1971a).

Chrysemys p. picta and *C. p. marginata* intergrade in the Northeast. Intergrades accounted for 79 percent of 89 individuals examined from the Delaware Water Gap in New Jersey (Stein 1980).[7]

KEY REFERENCES: Carr 1952, Ernst 1971, Ernst and Barbour 1972, Gibbons 1968a.

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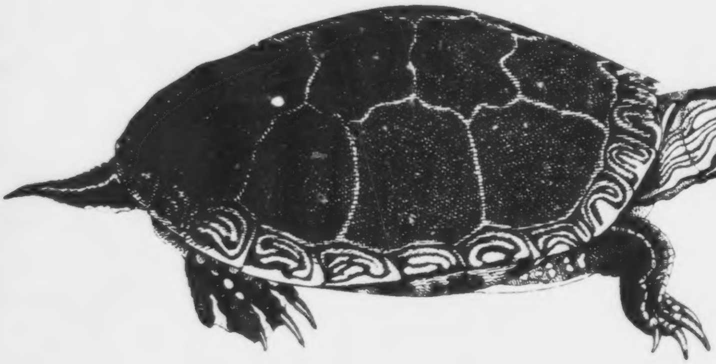
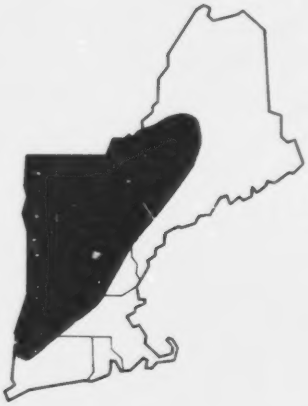
[7] Stein, R. J. Species account form for: Second symposium on endangered and threatened plants and animals of New Jersey. Unpublished.

Midland Painted Turtle

(Chrysemys picta marginata)





RANGE: New Hampshire, s. Quebec and Ontario to e. Wisconsin. Through c. Illinois s. to Tennessee. Vermont and New York s. to w. of the Shenandoah River.

RELATIVE ABUNDANCE IN NEW ENGLAND: Intergrades with *C. p. picta* are abundant.

HABITAT: Quiet water, preferably shallow areas with dense vegetation. Tolerant of some industrial pollution. Basks in groups on sunlit logs. Sometimes found away from water. Usually hibernates in muddy bottoms of ponds, but has been reported active yearlong.

SPECIAL HABITAT REQUIREMENTS: Aquatic habitats.

AGE/SIZE AT SEXUAL MATURITY: 5 years for males, 6 to 7 years for females (Pope 1939:185).

BREEDING PERIOD: Early spring after emerging from hibernation; fall matings have been reported.

EGG DEPOSITION: June to July. Eggs often laid in high banks.

CLUTCH SIZE: 3 to 10 eggs, average 5 to 8.

EGGS HATCH: Hatchlings emerge in September or the next spring (Smith 1961:140).

HOME RANGE/MOVEMENT: Average summer movement within a pond about 90 m. Movements have been divided into three types: initial emigration in the spring of 63 to 144 m from hibernation ponds to other ponds with mats of floating vegetation; late summer movements of 86 to 91 m, back to hibernation ponds; and late autumn movements of 88 to 130 m to deep water areas in Michigan (Sexton 1959). Sixty percent of the individuals studied in a Michigan lake exhibited homing behavior (Williams 1952).

FOOD HABITS/PREFERENCES: Aquatic vascular plants, seeds, algae, and invertebrates including crustaceans, mollusks, insects and their larvae, and worms. Also takes carrion, fish, and frogs. Aquatic plants accounted for more than 60 percent of the diet and insects about 20 percent in Michigan (Lagler 1943).

COMMENTS: In New England there are no Midland turtle populations *per se*. Individuals are part of an intergrade swarm. Information provided in this account is based on references for *Chrysemys picta marginata* where intergrades do not occur. In New England, *Chrysemys picta marginata* and *C. p. picta* life history and habitat information are the same (M. Klemens, personal communication). Diurnal.

KEY REFERENCES: Carr 1952, Sexton 1959, Smith 1961.

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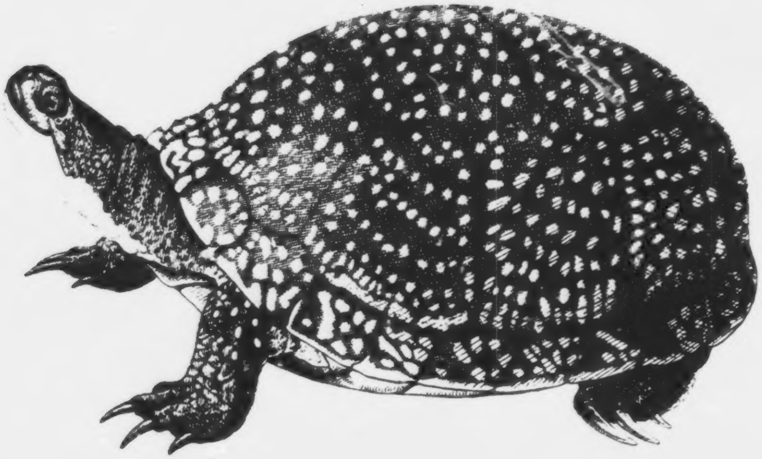
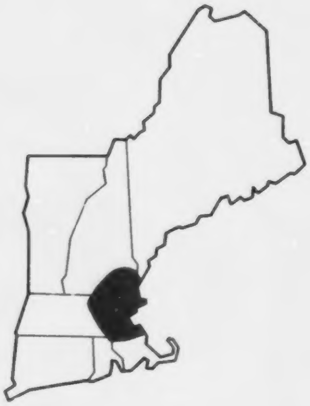
Blanding's Turtle

(Emydoidea blandingii)





RANGE: Scattered colonies in New York, New Hampshire, and e. Massachusetts. Southern Quebec across the Lake States to c. Minnesota, s. to Iowa and c. Illinois. Spotted occurrence from Nova Scotia to Ohio.

RELATIVE ABUNDANCE IN NEW ENGLAND: Populations localized and distribution spotty throughout its range (McCoy 1973:136.1). Generally scarce to rare, locally abundant in Massachusetts (Lazell 1972). An endangered species in Canada.

HABITAT: Shallow waters preferred; marshes, bogs, ditches, ponds, swamps, also in protected coves and inlets of large lakes with abundant aquatic vegetation. May wander overland. Basks on logs, stumps, banks. Active in winter or hibernates in mud or debris.

SPECIAL HABITAT REQUIREMENTS: Shallow waters with soft muddy bottoms and aquatic vegetation.

AGE/SIZE AT SEXUAL MATURITY: During 12th year for males with a plastron length of 181 to 190 mm, Massachusetts (Graham and Doyle 1977); males 131 to 190 mm in Michigan (Gibbons 1968b). Size differences between these two populations probably due to differences in food quality and availability (Graham and Doyle 1977).

BREEDING PERIOD: Early spring through October, most often from March to May (Ernst and Barbour 1972:181). Peak in late April (T. Graham, personal communication).

EGG DEPOSITION: June to July. Nests made in sandy soils of upland areas.

CLUTCH SIZE: 6 to 11 eggs (Carr 1952:136), typically 8 to 9 eggs, clutches of 9, 13, and 16 eggs for Massachusetts females (T. Graham, personal communication). Clutch of 17 for a July nesting female (Graham and Doyle 1979). Two clutches may be laid each season.

INCUBATION PERIOD: Unreported.

EGGS HATCH: Autumn or next spring.

HOME RANGE/MOVEMENT: Less than 100 m for 4 individuals in a marsh in sw. Michigan (Gibbons 1968b).

FOOD HABITS/PREFERENCES: Crustaceans, insects, mollusks, fish, carrion, aquatic plants, succulent shoots, and berries. Crustaceans and crayfish account for about 50 percent of diet, insects more than 25 percent, and other invertebrates and vegetable matter 25 percent (Lagler 1943).

COMMENTS: Escaped individuals found in Connecticut (Lamson 1935). Primarily diurnal. In Michigan found in rivers (M. Klemens, personal communication).

KEY REFERENCES: Gibbons 1968b, Graham and Doyle 1977, 1979, McCoy 1973.

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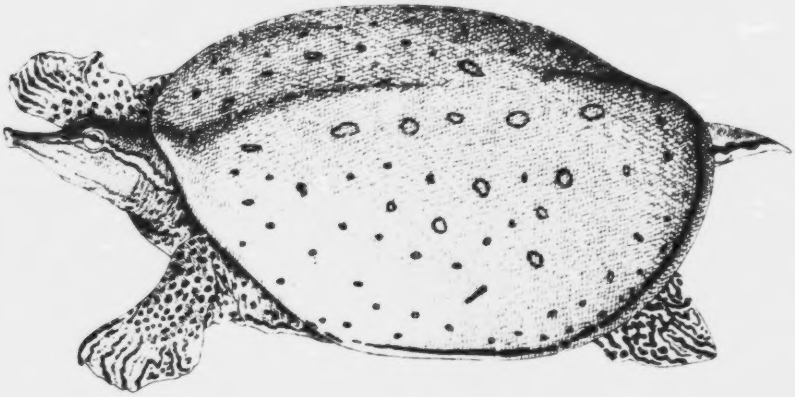
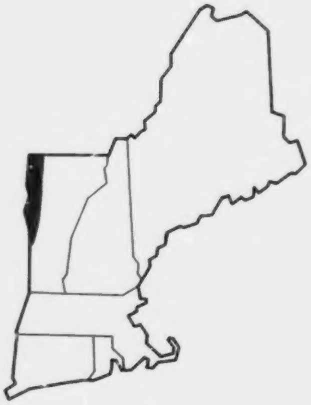
Eastern Spiny Softshell

(Trionyx s. spiniferus)





RANGE: Western New York across the Great Lakes states to the Mississippi River, n. Wisconsin s. to the Tennessee River extending e. to c. Pennsylvania. A disjunct colony occupies the Champlain Valley. Introduced into the Maurice River system of New Jersey.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Aquatic, inhabiting large river systems. Also found in lakes and ponds. Intolerant of pollution from sewage, industrial, or chemical wastes (Minton 1972:191). Basks on sand bars, mud flats, grassy beaches, but will use logs, rocks, and other objects when sandy or muddy banks are unavailable (Williams and Christiansen 1982). Hibernates beneath 2 to 3 inches (5.1 to 7.6 cm) of river bottom mud from October to April in the north.

SPECIAL HABITAT REQUIREMENTS: Shallow muddy bottoms for burrowing. Some aquatic vegetation essential (N. Green, personal observation).

AGE/SIZE AT SEXUAL MATURITY: Females with plastron length of 180 to 200 mm, males at 90 to 100 mm.

BREEDING PERIOD: April or May.

EGG DEPOSITION: May to August. Eggs laid in sandy soil or gravel beds near water's edge.

CLUTCH SIZE: Typically 12 to 18, with a range of 4 to 32 eggs (Ernst and Barbour 1972:264).

EGGS HATCH: August to October or hatchlings overwinter in nest.

HOME RANGE SIZE: Unreported.

FOOD HABITS/PREFERENCES: Chiefly carnivorous. Crayfish and insects are the major food items with tadpoles, frogs, mollusks, and fish eaten less frequently; vegetation and other plant materials also consumed. Primarily benthic feeders (Williams and Christiansen 1982).

COMMENTS: Somewhat nocturnal.

KEY REFERENCES: Ernst and Barbour 1972, Minton 1972, Webb 1973.

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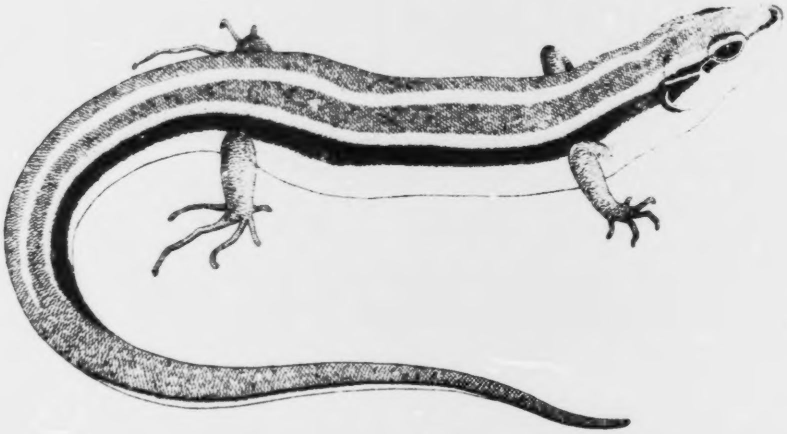
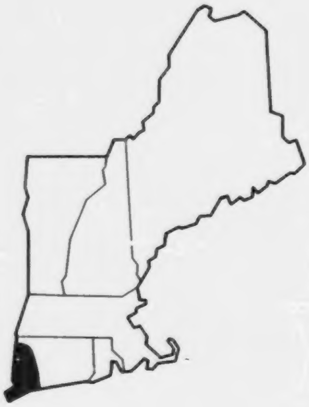
Five-lined Skink

(Eumeces fasciatus)





RANGE: Southern end of Lake George, New York and se. New York s. to n. Florida, w. to c. Texas. Northern limit from Pennsylvania, Ontario to c. Wisconsin and N. Missouri.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare in the Northeast through se. Connecticut. Records for Massachusetts are from Barre (Storer 1840:19) and New Bedford (Allen 1870:260).

HABITAT: Mesic wooded areas, open or moderately dense with ground cover. Most abundant around old buildings and open woods. Frequently in damp spots, under logs, rock piles, leaf litter, sawdust piles. Suns for brief periods on warm days (Smith 1946:349). Found on open talus slopes in mixed deciduous woodlands, New York. Primarily terrestrial, but will climb snags to find insects. Hibernates from October until mid-March in decaying logs or below the frost line, underground or under large rocks.

SPECIAL HABITAT REQUIREMENTS: Open woods with logs and slash piles.

AGE/SIZE AT SEXUAL MATURITY: After second hibernation.

BREEDING PERIOD: May.

EGG DEPOSITION: Typically in June or July, 6 to 7 weeks after breeding (Smith 1956:193). Eggs laid under rocks, logs, in rotted stumps, in loose soil. Females usually guard eggs during incubation (Conant 1975:122). Addled eggs are ingested; it has been suggested that brooding females remove these eggs to reduce chances of predation (Groves 1982).

CLUTCH SIZE: 4 to 20 eggs (Barbour 1971:209), typically 9 to 12. Younger individuals lay fewer eggs (Fitch 1970).

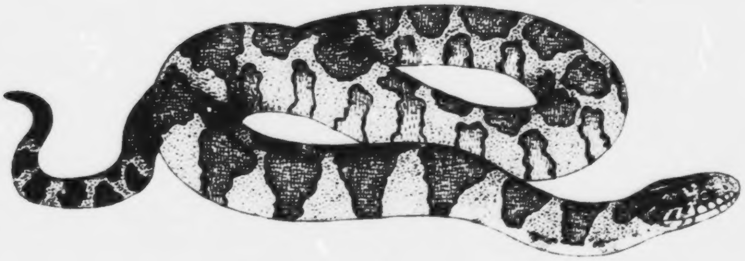
HOME RANGE/MOVEMENT: Males home-range diameter about 90 feet (27.4 m), females about 30 feet (9.1 m), in e. Kansas (Fitch 1954, cited in Minton 1972:210). Individuals may remain in same home range or move after emerging from hibernation.

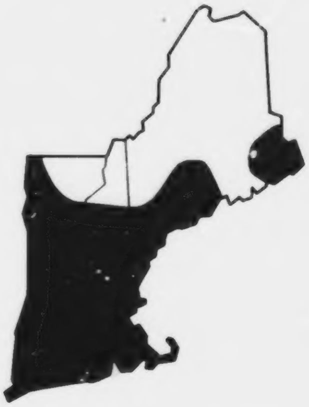
FOOD HABITS/PREFERENCES: Primarily insects and spiders, also snails, grubs, small vertebrates, including young mice. Lizards occasionally eaten; will eat its own shed skin.

KEY REFERENCES: Barbour 1971; Smith 1946, 1956.

Northern Water Snake

(Nerodia s. sipedon)





RANGE: Southern Maine, s. Ontario to n. Wisconsin, s. through Kansas to e. Colorado, n. Oklahoma to c. Indiana, Kentucky, and Tennessee, e. to North Carolina and New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant in suitable habitat.

HABITAT: Aquatic and semiaquatic habitats. Common around spillways and bridges where rocks provide cover, uncommon in deeply shaded woodland swamps and ponds, probably due to lack of basking sites (M. Klemens, personal communication). Found in the vicinity of rivers, brooks, wet meadows, ponds, swamps, bogs, old quarries. Inhabits salt or fresh water (Wright and Wright 1957:513), absent from heavily polluted waters. Prefers still or slow-moving water. Hibernates in crevices of rocky ledges, or in banks adjacent to water habitat.

SPECIAL HABITAT REQUIREMENTS: Branches or logs overhanging the water, or boulders of dams and causeways in reservoirs (T. Tyning, personal communication).

AGE/SIZE AT SEXUAL MATURITY: Males 635 to 1,148 mm, females at 650 to 1,295 mm (Wright and Wright 1957:513).

BREEDING PERIOD: April to May and early fall.

YOUNG BORN: August to early October, usually during the last half of August. Viviparous.

NO. OF YOUNG: 10 to 76 young, average 20 to 40. Larger females have larger litters.

HOME RANGE/MOVEMENT: One individual moved 380 feet (115.8 m) along a river after 2 years (Stickel and Cope 1947). In large ponds at an Indiana fish hatchery, 80 percent were recaptured in the same pond, 89 percent were in the same pond or an adjacent pond. Snakes along streams had larger home ranges (Fraker 1970).

FOOD HABITS/PREFERENCES: Cold-blooded vertebrates: fish account for 61 percent of food items, frogs and toads 21 percent, salamanders 12 percent; also insects, crayfish, recently dead fish (Uhler et al. 1939). Fish account for more than 95 percent of diet (Raney and Roecker 1947). May occasionally take shrews and mice.

COMMENTS: Frequently found basking. Active both day and night.

KEY REFERENCES: Schmidt and Davis 1941, Wright and Wright 1957.

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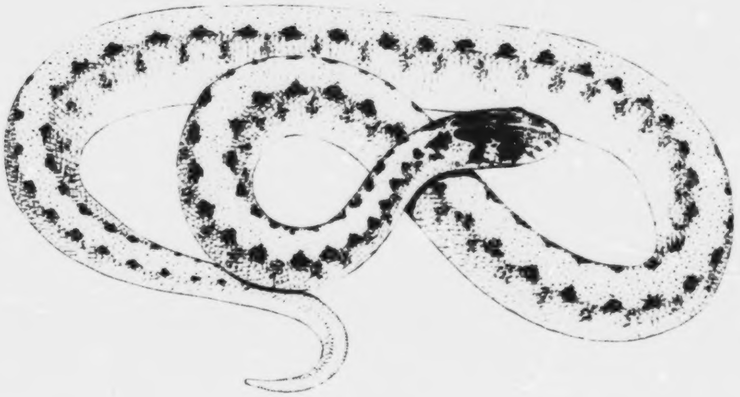
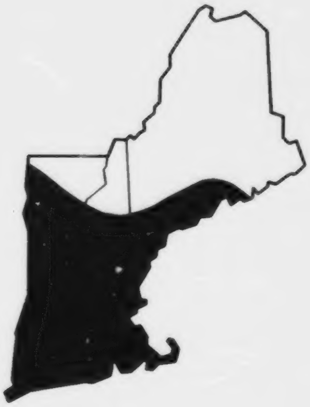
Northern Brown Snake

(Storeria d. dekayi)





RANGE: Eastern United States from s. Maine and s. Canada w. to Michigan, s. to South Carolina. Range overlaps that of the Midland brown snake. Reported from Somerset Co., Maine, October 1984 (C. Baumgartner and R. Nemecek, personal communications).

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Ubiquitous, found in urban and rural areas, dry or moist situations, vacant lots, parks, trash piles. May be abundant along railroad tracks (T. Tyning, personal communication). In the wild, found in damp woods, swamps, clearings, bogs, roadsides, open fields. Hides under stones, banks, logs, brush piles, leaves. Rare in old-growth forests (J. Lazell, personal communication). Hibernates in large groups from October to November until March or April; may use ant hills or abandoned mammal burrows.

AGE/SIZE AT SEXUAL MATURITY: At 2 years (Noble and Clausen 1936).

BREEDING PERIOD: Late March to April and possibly in the fall.

YOUNG BORN: Late July to August. Gestation period of 105 to 113 days (Clausen 1936). Viviparous.

NO. OF YOUNG: 3 to 27 young (Fitch 1970), typically 14.

HOME RANGE/MOVEMENT: Average daily movement of 10 to 15 feet (3.0 to 4.6 m) on Long Island. Thirteen of 32 individuals displayed homing behavior (Noble and Clausen 1936).

FOOD HABITS/PREFERENCES: Slugs, snails, earthworms, insects, minnows, and tiny toads are occasionally eaten.

COMMENTS: Formerly DeKay's snake. Commonly found in aggregations throughout the year (Noble and Clausen 1936). May seem to be scarce during July and August when it moves down into soil to lower temperature zones. Degree of fossorial tendency varies with microhabitat temperature preference (Elick et al. 1979). Active evening to early morning; one of the few New England snakes that is active at night.

KEY REFERENCES: Schmidt and Davis 1941, Wright and Wright 1957.

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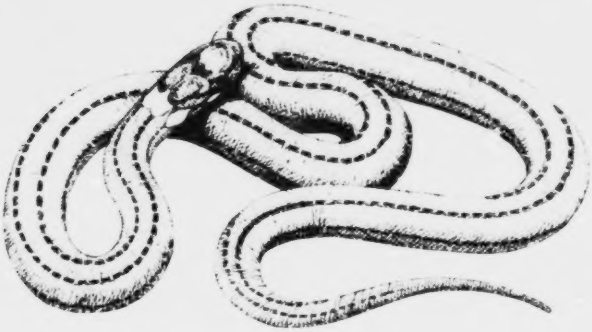
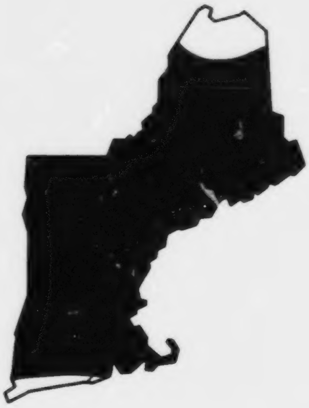
Northern Redbelly Snake

(Storeria o. occipitomaculata)





RANGE: Nova Scotia to s. Manitoba, s. to e. Texas, Georgia, and throughout the Eastern United States.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally abundant.

HABITAT: Moist woods, hillsides, sphagnum bogs, upland meadows and valleys. Found under surface debris, also around abandoned buildings. Occurs at elevations from sea level to mountains. Prefers woodlands: pine, oak-hickory, aspen, hemlock groves (Wright and Wright 1957:717). More frequently found in upland woody ridges. Occasionally found in damp meadows, marshy areas, swamp and bog edges. Hibernates from fall to March or April. Active through mid-October in Connecticut (M. Klemens, personal communication).

SPECIAL HABITAT REQUIREMENTS: Woodlands.

AGE/SIZE AT SEXUAL MATURITY: Males 182 to 359 mm, females 211 to 383 mm (Wright and Wright 1957:718), at 2 years (Blanchard 1937a).

BREEDING PERIOD: Probably after emerging from hibernation; a late summer or fall mating may also occur (Barbour 1971:287).

YOUNG BORN: August to September. Viviparous.

NO. OF YOUNG: 1 to 14 young (Blanchard 1937a), typically 7 to 8.

HOME RANGE/MOVEMENT: 1 adult found 100 feet (30.4 m) from release point in Michigan after 7 days (Blanchard 1937a).

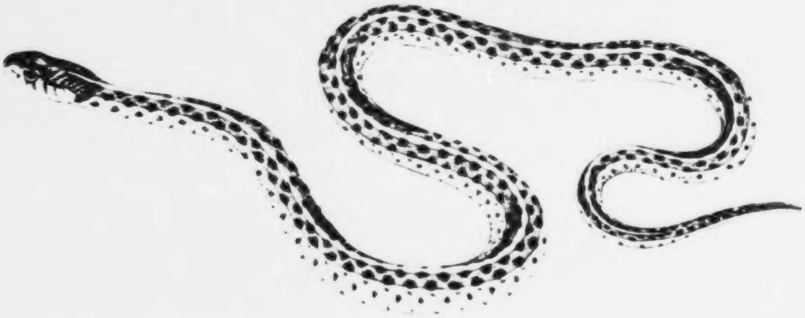
FOOD HABITS/PREFERENCES: Consumes slugs, earthworms, soft insects and larvae, sowbugs; occasionally small salamanders.

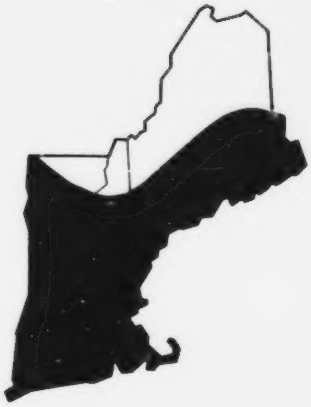
COMMENTS: Has been found active at all times of day and evening. Degree of fossorial behavior varies (Elick et al. 1979). Young commonly mistaken for young ring-neck or Northern brown snakes.

KEY REFERENCES: Barbour 1971, Schmidt and Davis 1941, Wright and Wright 1957.

Eastern Garter Snake

(Thamnophis s. sirtalis)





RANGE: Nova Scotia to e. Manitoba s. to e. Texas, and throughout the Eastern United States. Intergradation with *T. s. pallidula* occurs in n. New England (Fitch 1980: 270.1).

RELATIVE ABUNDANCE IN NEW ENGLAND: Very abundant; most common and widespread snake.

HABITAT: Ubiquitous, terrestrial; found in moist areas, forest edges, stream edges, fence rows, vacant lots, bogs, swamps, overgrown yards. One specimen found under a rock in a stream through a dark hemlock grove (M. Klemens, personal communication). Found in almost all damp environments, from river bottoms to mountain elevations.

Hibernates, often gregariously, in holes, rock crevices, mud, anthills, rotted wood, uprooted trees, house foundations, and sometimes partially or completely submerged under streamed rocks, from October to March or April. One of the earliest snakes to emerge from hibernation. Can survive the winter above frost line (Bailey 1949).

AGE/SIZE AT SEXUAL MATURITY: Females in second year, some males the second spring after birth (Carpenter 1952a). At 400 mm snout to vent length for males and 500 mm for females in Kansas (Fitch 1965:531).

BREEDING PERIOD: Concentrated in the first few warm days after emergence from hibernation in mid-March to May, also in fall before hibernation (Anderson 1965:169). Mates at or near hibernation site.

YOUNG BORN: July to early September. Gestation period of 3 to 4 months or longer in cooler climates (Blanchard and Blanchard 1942). Viviparous.

NO. OF YOUNG: 3 to 85 young, typically 14 to 40. Zehr (1962) found 12 to 13 young was the average in New Hampshire. Number of young correlated with size and age of female (Fitch 1965:558).

HOME RANGE/MOVEMENT: Approximately 5 acres (2.0 ha), most ranges were smaller in cutover agricultural fields in Indiana (Minton 1972). Activity range of about 2 acres (0.8 ha) in Michigan woodlands and open fields (Carpenter 1952a). Carpenter (1952b:250) defined activity range as an area covered by an animal in the course of its day-to-day existence, and which lacks definite home site or other center of activity. Home ranges of 35.0 acres (14 ha) for males and 22.2 acres (9.1 ha) for females were found in mixed habitat in Kansas (Fitch 1965:538). Many individuals migrate from hibernacula to summer ranges.

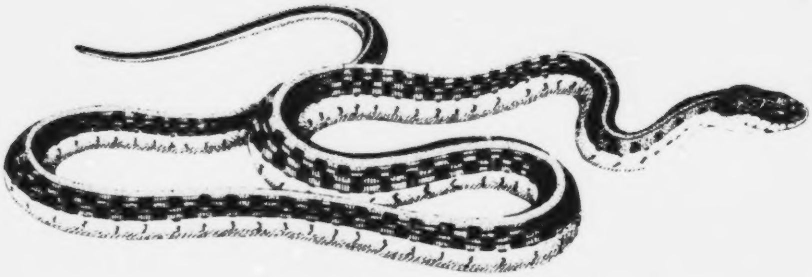
FOOD HABITS/PREFERENCES: Earthworms account for 80 percent of food items, also amphibians, carrion, fish, leeches, caterpillars, other insects, small birds, rodents (Carpenter 1952b); also slugs, other snakes, mollusks, crayfish, sowbugs (Hamilton 1951).

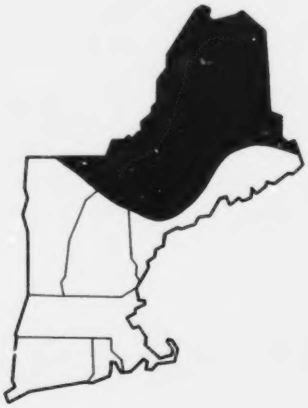
COMMENTS: Diurnal but sometimes active at night (Minton 1972:250). Seeks cover under objects on hot summer days. Pesticides have reduced local populations in New York (Gochtfeld 1975).

KEY REFERENCES: Carpenter 1952b; Fitch 1965, 1980; Wright and Wright 1957.

Maritime Garter Snake

(Thamnophis sirtalis pallidula)





RANGE: Eastern Quebec extending to Alberta in discontinuous populations, s. to n. New Hampshire, New York and n. Michigan. Intergrades with *T. s. sirtalis* to w. and s. parts of range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Unreported.

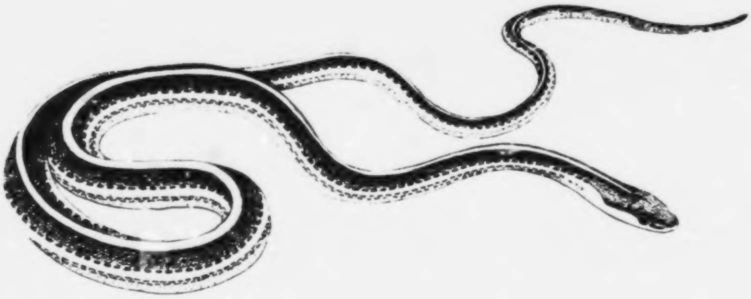
HABITAT: Found in mature hardwood stands, fir stands with mixed understory, and along forest roads in northern New Hampshire.

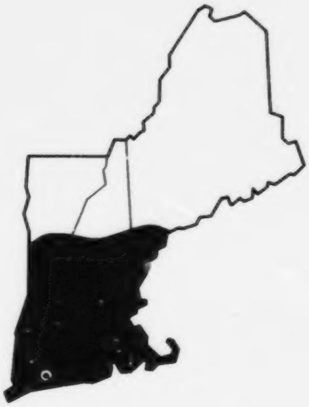
COMMENTS: Little information available on life history.

KEY REFERENCES: Bleakney 1959, Fitch 1980.

Eastern Ribbon Snake

(Thamnophis s. sauritus)





RANGE: Southern Maine to South Carolina and the Florida panhandle. Southern Indiana s. to e. Louisiana. Northern limits through s. Indiana to c. New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Generally common, but uncommon in Connecticut (M. Klemens, personal communication).

HABITAT: Semiaquatic, inhabiting stream edges, swampy areas, wet meadows, ponds, bogs, and ditches. Prefers areas with brushy vegetation at waters' edge for concealment. Also in damp or wet deciduous or northern pine forests. Seldom far from cover (Carpenter 1952b). May escape higher ground temperatures in summer by seeking shelter in shrubs or underground. Hibernates from October to March (Wright and Wright 1957:825).

SPECIAL HABITAT REQUIREMENTS: Mesic woodlands with aquatic habitat.

AGE/SIZE AT SEXUAL MATURITY: Females during second year (Carpenter 1952a), males 400 to 819 mm, females 451 to 900 mm (Wright and Wright 1957:825).

BREEDING PERIOD: After emergence from hibernation.

YOUNG BORN: Late July to September, viviparous.

NO. OF YOUNG: 3 to 20, typically 10 to 12.

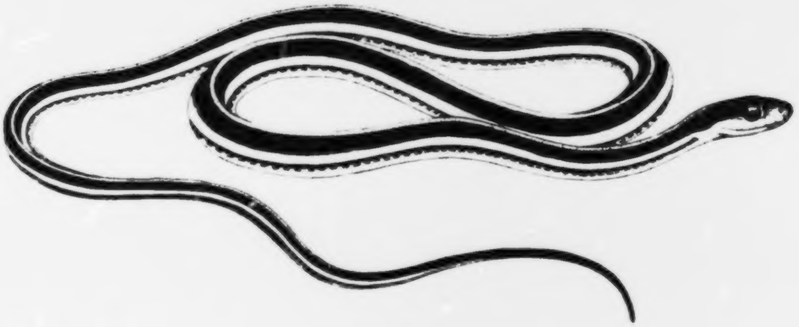
HOME RANGE/MOVEMENT: Average activity range of about 2 acres (0.8 ha), average distance traveled was approximately 280 feet (85.3 m) in open Michigan grassland and marsh (Carpenter 1952b).

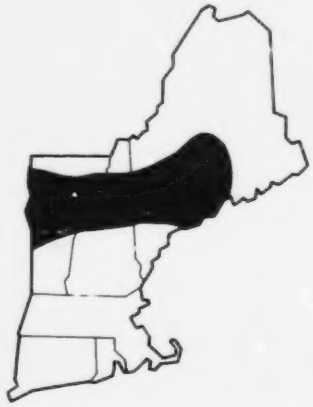
FOOD HABITS/PREFERENCES: Frogs, toads, and salamanders account for 90 percent of prey items; usually smaller or metamorphosizing individuals were taken; also mice, spiders, minnows, and some insects (Carpenter 1952b).

KEY REFERENCES: Carpenter 1952b, Rossman 1970.

Northern Ribbon Snake

(Thamnophis sauritus septentrionalis)





RANGE: Central Maine w. through nw. New England and s. Ontario to Michigan, s. to se. Illinois, Indiana, Ohio and n. Pennsylvania.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare.

HABITAT: Sunny areas with low, dense vegetation that is near bodies of shallow quiet water. Damp meadows, grassy marshes, northern sphagnum bogs, borders of ponds, lakes and meandering creeks. Semiaquatic. Probably hibernates October to March (Minton 1972:260).

SPECIAL HABITAT REQUIREMENTS: Shallow, permanent water in open, grassy habitat.

AGE/SIZE AT SEXUAL MATURITY: Some females at almost 2 years (Carpenter 1952a).

BREEDING PERIOD: Probably spring and fall (Minton 1972:260).

YOUNG BORN: July to August (Minton 1972:260).

NO. OF YOUNG: 4 to 10 or 11 young (Minton 1972:260). Viviparous.

HOME RANGE/MOVEMENT: Unknown.

FOOD HABITS/PREFERENCES: Frogs, salamanders, fish. Captives will eat minnows. Brown (1979) noted that 93 percent of the food items in 21 stomachs were comprised of anurans.

COMMENTS: Diurnal.

KEY REFERENCES: Conant 1975, Minton 1972.

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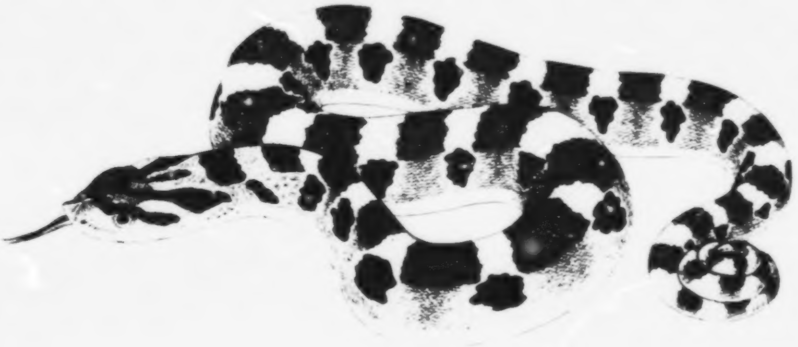
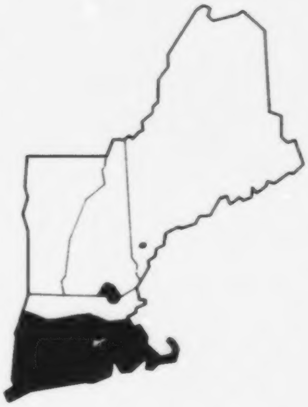
Eastern Hognose Snake

(Heterodon platyrhinos)





RANGE: Cape Cod and c. Massachusetts w. to Ohio, s. Ontario, c. Minnesota, and se. South Dakota, s. to c. Texas and s. Florida. Recently reported from Hillsborough, New Hampshire, in 1984 (unconfirmed). Also from Kittery, Maine (W. Chorman, personal communication).

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Where sandy soils predominate, such as beaches, open fields, dry, open pine or deciduous woods. Has been found on hillsides, farm fields, and around outbuildings. In Pennsylvania most frequently found in upland situations, intermountain and river valleys (McCoy and Bianculli 1966). Low-lying areas of Connecticut (M. Klemens, personal communication), and in marshy woodlands in the Albany Pine Bush in New York, and wooded creek bottomlands (M. Stewart, personal communication). Hibernates from late September to April or May under forest floor debris, stumps, trash piles (Wright and Wright 1957:308).

SPECIAL HABITAT REQUIREMENTS: Sandy soils, open woodlands.

AGE/SIZE AT SEXUAL MATURITY: Male 400 to 1,050 mm, females 450 to 1,200 mm (Wright and Wright 1957:309).

BREEDING PERIOD: April to May and probably fall (Fitch 1970).

EGG DEPOSITION: June to July. Eggs laid in earth, under or in pulpy wood of decaying logs.

CLUTCH SIZE: 4 to 61 eggs, typically 22 (Fitch 1970).

INCUBATION PERIOD: 39 to 60 days (Anderson 1965:183).

EGGS HATCH: July to September, peak in August.

HOME RANGE/MOVEMENT: After 5 months one individual in Maryland mixed habitat had moved 100 feet (30 m) (Stickel and Cope 1947).

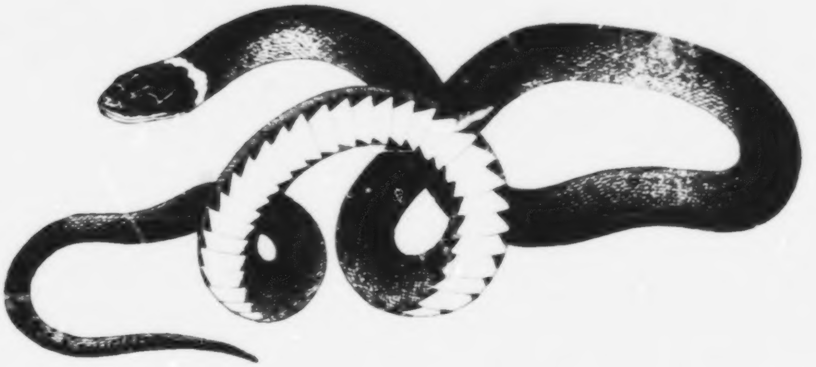
FOOD HABITS/PREFERENCES: Toads preferred, but frogs, fish, salamanders, insects, and worms are taken; rarely small birds and mammals and occasionally other snakes (Edgren 1955). Amphibians and reptiles accounted for 80 percent of the food items in 10 specimens in Virginia (Uhler et al. 1939).

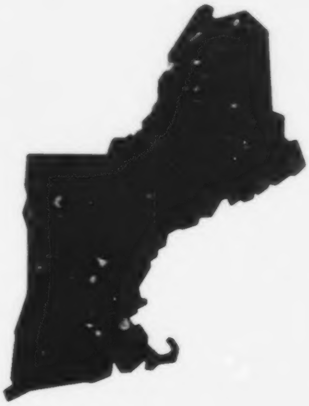
COMMENTS: Diurnal. Fossorial habits, probably seek cover by burrowing (Edgren 1955). Particularly vulnerable to heavy herbicide and pesticide use. Defense behavior includes head rearing, "hood" display, mock striking, and feigning death.

KEY REFERENCES: Blem 1981, Edgren 1955, McCoy and Bianculli 1966, Smith 1956, Wright and Wright 1957.

Northern Ringneck Snake

(Diadophis punctatus edwardsi)





RANGE: Nova Scotia, s. Ontario to Wisconsin. Eastern and s. Ohio to se. Illinois, n. Alabama and ne. through c. Virginia to New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Secretive, found under cover especially in moist shady woodlands with abundant hiding cover: stony woodland pastures, rocks, stone walls, old woodland junk piles, logs, debris, loose bark of logs and stumps; shale banks in Maine (Fowler and Sutcliffe 1952), and boards are all used as cover. Hibernates from September to April or May. One individual found in a woodchuck den (Grizzel 1949).

SPECIAL HABITAT REQUIREMENTS: Mesic areas with abundant cover.

AGE/SIZE AT SEXUAL MATURITY: Males at 13 to 14 months (Fitch 1960b), males 220 to 500 mm, females 220 to 550 mm (Wright and Wright 1957:187).

BREEDING PERIOD: Soon after emerging from hibernation.

EGG DEPOSITION: Late June to early July. Eggs laid in rotted logs, under logs or stones. Several females may use the same nest.

CLUTCH SIZE: 1 to 10 eggs, typically 3 or 4 (Blanchard 1937b). Smaller females lay fewer eggs (Fitch 1970).

INCUBATION PERIOD: 4 to 6 weeks (Minton 1944). Average of 56 days in laboratory conditions (Blanchard 1930, cited in Wright and Wright 1957:188).

EGGS HATCH: Late August through September.

HOME RANGE/MOVEMENT: Undocumented.

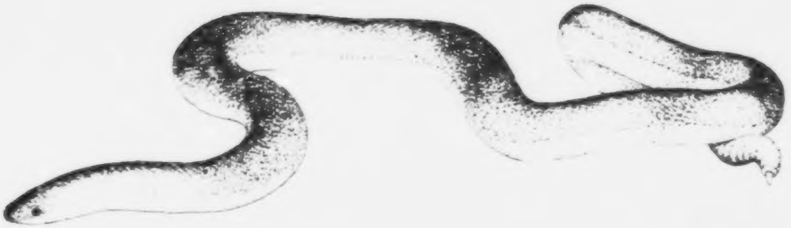
FOOD HABITS/PREFERENCES: Toads, frogs, salamanders, earthworms, lizards, small snakes, insects, and grubs.

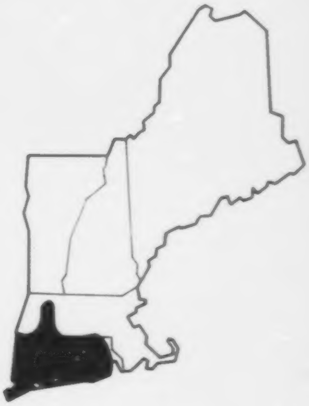
COMMENTS: Nocturnal. Degree of fossorial tendency varies with temperature preference (Elick et al. 1979).

KEY REFERENCES: Schmidt and Davis 1941, Wright and Wright 1957.

Eastern Worm Snake

(Carphophis a. amoenus)





RANGE: Southcentral Massachusetts, se. New York through c. Pennsylvania to s. Ohio. South to c. Alabama, n. Georgia and South Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally abundant.

HABITAT: Dry to moist forests, often near streams; in the loose soil of gardens or weedy pastures. Sandy areas favored (M. Klemens, personal communication). Found in dry oak/pitch pine areas in Springfield, Massachusetts, (T. Tyning, personal communication) and under loose bark slabs, logs, stones, leaves, and other debris. Fossorial; has extended periods of inactivity. Hibernates in rotting wood, underground, or in burrows of other animals. Remains underground until May except for warm sunny days.

SPECIAL HABITAT REQUIREMENTS: Loose soil for burrowing, cover objects.

AGE/SIZE AT SEXUAL MATURITY: 3 years (Fitch 1970).

BREEDING PERIOD: Probably spring to early summer (McCauley 1945:97) and fall (Fitch 1970).

EGG DEPOSITION: Late June to early July. Eggs probably laid in depressions under boulders or in hollow logs. Incubation period of 48 to 49 days in Kansas (Fitch 1970).

CLUTCH SIZE: 2 to 8 eggs (Wright and Wright 1957:106), typically 5 (McCauley 1945:55).

EGGS HATCH: August to September.

HOME RANGE/MOVEMENT: About 0.25 acre (0.1 ha) in Kentucky (Barbour 1971:240). Average for 10 individuals in a forested mountainous area of Kentucky was 253 m^2 or 0.025 ha (Barbour et al. 1969a).

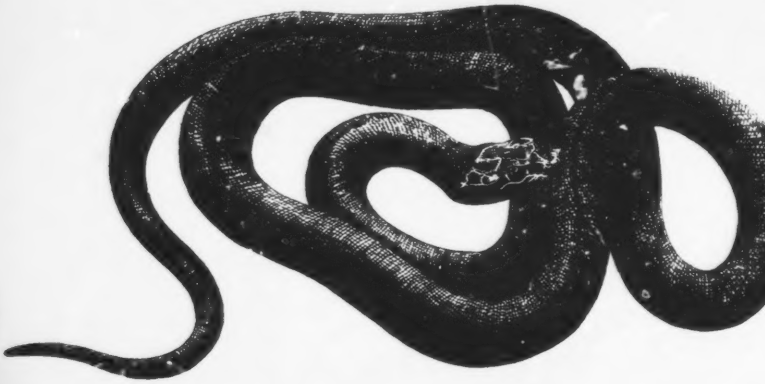
FOOD HABITS/PREFERENCES: Earthworms, soft-bodied insects and their larvae, grubs or slugs.

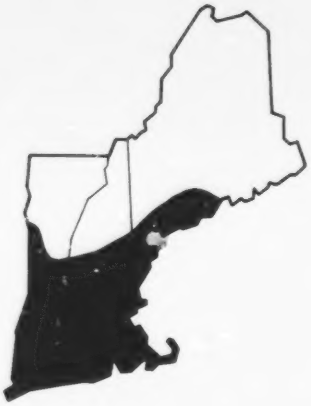
COMMENTS: Nocturnal and secretive.

KEY REFERENCES: Barbour et al. 1969a, Schmidt and Davis 1941, Wright and Wright 1957.

Northern Black Racer

(Coluber c. constrictor)





RANGE: Southern Maine to sw. Ohio, s. to c. Alabama to South Carolina and throughout the Eastern United States.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally abundant.

HABITAT: Moist or dry areas, forests and wooded areas, fields, roadsides, swamps, marshes, clearings, near old buildings, trap rock ridges (M. Klemens, personal communication), stone walls, and farms. Has been found in deciduous and pine forests. Partially arboreal. Will use ledges for sunning.

Hibernates in large congregations, sometimes with copperheads and rattlesnakes, often using deep rock crevices or abandoned woodchuck holes. Among the earliest snakes to emerge from hibernation.

AGE/SIZE AT SEXUAL MATURITY: Males at 13 to 14 months (Fitch 1960b), males 680 to 1,595 mm, females 710 to 1,683 mm (Wright and Wright 1957:135).

BREEDING PERIOD: May to early June.

EGG DEPOSITION: June to early July. Laid in rotting wood, stumps, decaying vegetable matter, loose soil.

CLUTCH SIZE: 7 to 31 eggs, typically 16 to 17, clutch size proportional to size of female (Fitch 1963:420).

INCUBATION PERIOD: Average of 51 days (Fitch 1970).

EGGS HATCH: Late August to September.

HOME RANGE/MOVEMENT: Very territorial; seems to have definite home range (Smith 1956:239). Average distance of 903 feet (275.2 m) in mixed Maryland habitat for 3 individuals after 2 years (Stickel and Cope 1947). Requires large tracts of mixed old fields and woodlands (M. Klemens, personal communication).

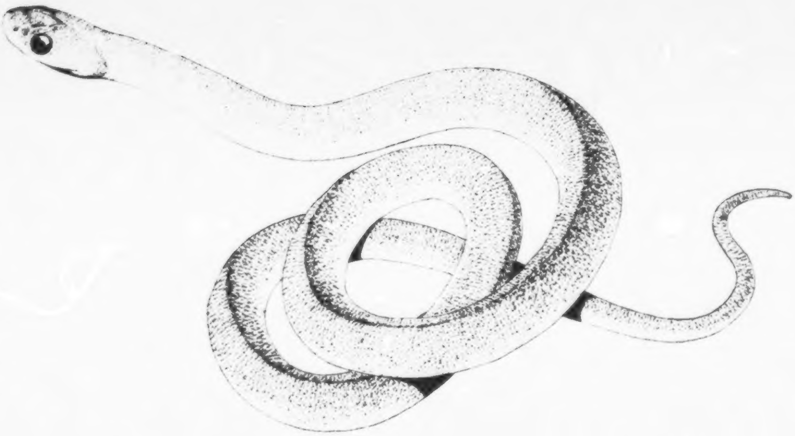
FOOD HABITS/PREFERENCES: Varied diet includes small mammals, insects, frogs, toads, small birds, birds' eggs, snakes and lizards (Uhler et al. 1939). Small mammals and insects are 50 percent of diet (Surface 1906).

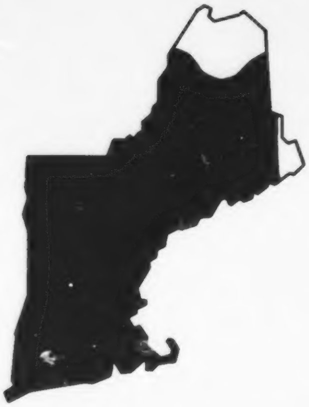
COMMENTS: Diurnal.

KEY REFERENCES: Fitch 1963, Wilson 1978.

Eastern Smooth Green Snake

(Opheodrys v. vernalis)





RANGE: Nova Scotia, s. Ontario, into c. Minnesota to s. Wisconsin, Michigan, ne. Ohio to the Appalachians of Virginia and West Virginia and north from c. New Jersey throughout New England with the possible exception of n. Maine.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common, but currently declining in s. New England.

HABITAT: Upland areas, grassy fields, mountain meadows; high altitude areas with grassy, open spots. Also found in open aspen stands, sphagnum bogs, marshes, in vines and brambles, and hardwood stands.

SPECIAL HABITAT REQUIREMENTS: Upland grassy openings.

AGE/SIZE AT SEXUAL MATURITY: Probably second year (Seibert and Hagen 1947).

BREEDING PERIOD: Late August in Ontario (Smith 1956:236). Spring and late summer (Behler and King 1979:640).

EGG DEPOSITION: Late July to August.

CLUTCH SIZE: 3 to 12 eggs (Wright and Wright 1957:558), typically 7 (Blanchard 1933). Nest sites may be used by several females.

INCUBATION PERIOD: Varies from 4 to 23 days (Blanchard 1933).

EGGS HATCH: August to early September.

HOME RANGE/MOVEMENT: Less than 30 yards (27.4 m) for 10 of 12 individuals studied in an uncultivated field in Illinois (Seibert and Hagen 1947).

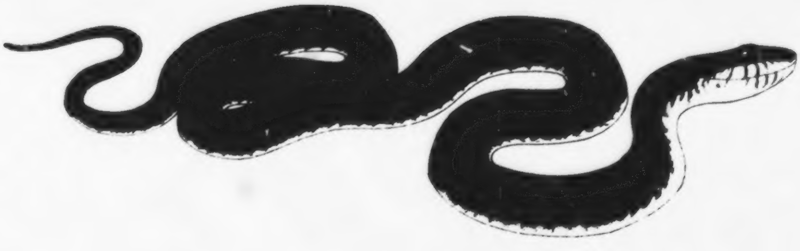
FOOD HABITS/PREFERENCES: Insects account for 73 percent of prey items, also spiders, snails (Surface 1906). Salamanders, millipedes, centipedes, particularly caterpillars, orthopterans, ants, flies (Uhler et al. 1939).

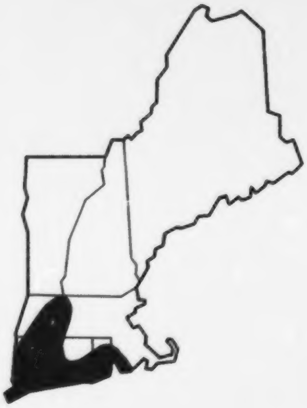
COMMENTS: Hibernates early fall to April or May. Population decline may be related to insecticide spraying and loss of open fields and pasture. Inhabits abandoned farmland dominated by successional vegetation and man-made debris on Long Island, New York (Schlauch 1975).

KEY REFERENCES: Schmidt and Davis 1941, Seibert and Hagen 1947, Wright and Wright 1957.

Black Rat Snake

(Elaphe o. obsoleta)





RANGE: Southwestern New England w. through s. New York to sc. Illinois, and the Mississippi River area in Wisconsin, south to Oklahoma, c. Louisiana and Georgia. Range may be extending n. in the Connecticut River Valley (T. Tyning, personal communication).

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Variety of habitats including woodlands, thickets, field edges, farmlands, rocky hillsides and mountaintops, river bottoms, old barns. Readily climbs trees. Found in dry oak and oak-hickory woods, and mesic bottomland forests, may occur in very dense woods (Wright and Wright 1957:232). In Connecticut found in gorges and some coastal areas (M. Klemens, personal communication).

Hibernates late November to April, may use talus slopes, cisterns or unused wells. Often found in groups with copperheads and rattlesnakes where these snakes occur.

AGE/SIZE AT SEXUAL MATURITY: At 4 years (Fitch 1970). Males 1,095 to 1,835 mm, females 715 to 1,800 mm (Wright and Wright 1957:233).

BREEDING PERIOD: May to June.

GESTATION PERIOD: 8 to 12 weeks (Oliver 1955:243).

EGG DEPOSITION: July to August. Laid in loose soil, decaying wood, manure piles, sawdust piles.

CLUTCH SIZE: 6 to 24 eggs, typically 14.

HOME RANGE/MOVEMENT: Average at least 600 m in diameter for males, and at least 500 m for females in woods and fields in Maryland (Stickel et al. 1980).

FOOD HABITS/PREFERENCES: Small mammals account for 60 percent of prey items, particularly rodents, small birds and their eggs (30 percent), also amphibians, insects, spiders (Uhler et al. 1939). Young opossums, weasels, owls, and sparrow hawks have been captured as food (Minton 1972:272). Prey is killed by constriction.

COMMENTS: Formerly pilot or pilot black snake. Diurnal and arboreal. May reside in hollow trees (Conant 1975:194).

KEY REFERENCES: Anderson 1965, Schmidt and Davis 1941, Smith 1956, Stickel et al. 1980, Wright and Wright 1957.

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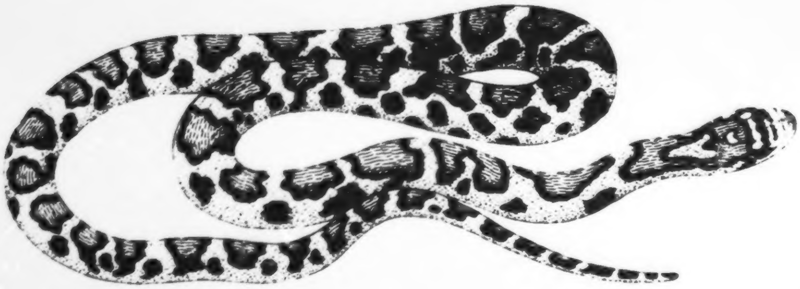
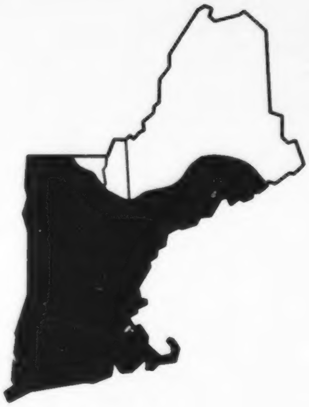
Eastern Milk Snake

(Lampropeltis t. triangulum)





RANGE: Southeastern Maine and s. Ontario to c. Minnesota, s. to Tennessee and w. North Carolina and throughout the Northeast. Intergrades with the scarlet king snake (*L. t. elapsoides),* in the sw. and se. portion of its range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Various habitats, usually with brushy or woody cover, and found from sea level to mountain elevations. Usually found under cover. Farmlands, woods, outbuildings, meadows, river bottoms, bogs, rocky hillsides, rodent runways (M. Klemens, personal communication). Found under logs, stones, boards, well covers, stones in creek bottoms (M. Stewart, Personal communication) or other cover during the day. In pine forests, second-growth pine, bog woods, hardwoods, aspen stands. Hibernates from October or November to April.

SPECIAL HABITAT REQUIREMENTS: Suitable cover or loose soil for egg laying.

AGE/SIZE AT SEXUAL MATURITY: Third or fourth year (Fitch and Fleet 1970), males to 1,115 mm, females 404 to 966 mm (Wright and Wright 1957:371).

BREEDING PERIOD: June (Wright and Wright 1957:371).

EGG DEPOSITION: Mid-June to July, in piles of soil, sawdust or manure, or under other cover, often in a communal nest site.

CLUTCH SIZE: 6 to 24 eggs, typically 13.

INCUBATION PERIOD: 6 to 8 weeks (Wright and Wright 1957:371).

EGGS HATCH: Late August to October.

HOME RANGE/MOVEMENT: About 50 acres (20.25 ha) for *L. t. syspila,* movements of 250 to 1,300 feet (76.2 to 396.2 m) in open woodland in ne. Kansas (Fitch and Fleet 1970). Seasonal movement probable from drier hibernation sites to moist bottomlands for the summer (Breckenridge 1958, cited in Williams 1978:79).

FOOD HABITS/PREFERENCES: Mice, other small mammals, other snakes, lizards, birds and their eggs, slugs. Mice accounted for 74 percent of the volume of stomach contents of 42 milk snakes in Pennsylvania (Surface 1908). Forages for food at night.

COMMENTS: Typically nocturnal. Numbers may be declining as abandoned fields revert to forests (T. Tyning, personal communication).

KEY REFERENCES: Fitch and Fleet 1970, Schmidt and Davis 1941, Wright and Wright 1957.

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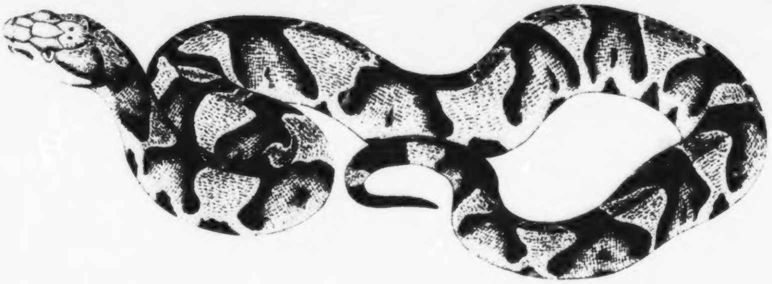
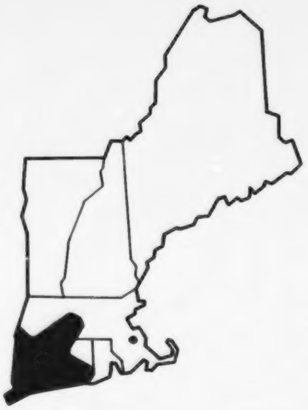
Northern Copperhead

(Agkistrodon contortrix mokeson)





RANGE: Southwestern New England to sw. Illinois, s. to c. Georgia and through c. North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Usually associated with deciduous forests. Occupies varied habitats from swamps to mountain tops. Prefers areas with damp leaf litter (Fitch 1960a:116). Exposed mountainous, rocky hillsides, talus slopes, basalt ridges, ledges, open woods. Found in habitats with large rocks, rotting wood, and sawdust piles. During summer months may be found near swamps, ponds, or streams. Largely outside of white pine-northern hardwood, and beech-maple associations (Fitch 1960a:123). Reinert (1984) found this species used relatively open areas with high rock density and low density surface vegetation.

SPECIAL HABITAT REQUIREMENTS: Rocky hillsides, talus slopes.

AGE/SIZE AT SEXUAL MATURITY: Males during their second summer, females at 3 years (Fitch 1960a:272).

BREEDING PERIOD: After emergence from hibernation in April to May, peak in late May. Sperm may remain viable in the female for more than a year after copulation (Allen 1955). Gestation period of 105 to 110 days (Fitch 1960a:116).

YOUNG BORN: August to September, typically September in the Northeast. Viviparous.

NO. OF YOUNG: 1 to 17 young, typically 5 to 6 (Wright and Wright 1957:913). Litters produced in alternate years.

HOME RANGE/MOVEMENT: In mixed habitat of woodlands, ledges and grassland in Kansas. Fitch (1960a:147-149) recorded 24.4 acres (9.7 ha) for males and 8.5 acres (3.4 ha) for females. Seasonal movements occur between hibernaculum and lowland areas.

FOOD HABITS/PREFERENCES: Mice, other small rodents, insects, small birds, salamanders, lizards, small snakes, frogs, toads. Food obtained by ambush.

COMMENTS: Nocturnal during summer months, diurnal in spring and fall. Has survived eradication in some areas due to cryptic coloration and retiring habits. Usually gregarious. During hibernation (from October to April), sometimes found with other species of snakes including rattlesnakes, but mutually exclusive in Connecticut (Petersen 1970). Den sites are reused each year — a major limiting factor.

KEY REFERENCES: Anderson 1965, Fitch 1960a, Reinert 1984, Schmidt and Davis 1941, Smith 1956, Wright and Wright 1957.

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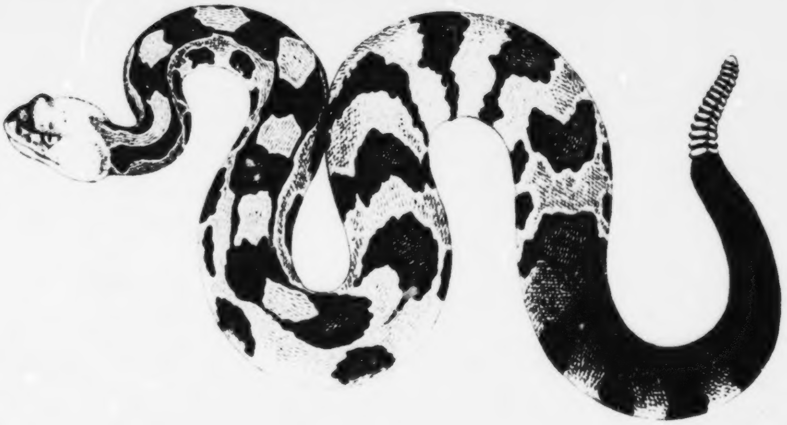
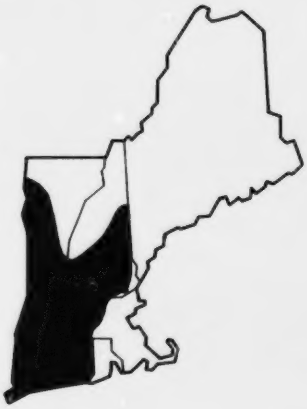
Timber Rattlesnake

(Crotalus horridus)





RANGE: Southern New Hampshire, the Champlain Valley to sw. New York, w. along the Ohio River Valley and n. to the Mississippi River in Wisconsin. Extending to n. Texas s. Illinois, n. Georgia and through the Appalachians to New Jersey.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Timbered areas with rocky outcroppings, dry ridges, and second growth deciduous or coniferous forests with high rodent populations. Usually southern exposures. Sometimes in swamps, quarries, old stone walls, abandoned buildings. Often found near streams in late summer. Most common in areas not frequented by man, few such sites remain. Reaches elevations of 6,000 feet (1,800 m) in the Southeast, but probably not found at highest elevations in the Northeast due to harsh climatic conditions (Klauber 1972:511). Reinert (1984) found that in Pennsylvania this species frequented forested habitats rather than dry, rocky outcroppings. Hibernates from September to April in large numbers in rocky crevices usually overgrown with brush. Found with copperheads and other snakes, due to paucity of hibernacula (T. Tyning, personal communication).

SPECIAL HABITAT REQUIREMENTS: Rock outcroppings on forested hillsides.

AGE/SIZE AT SEXUAL MATURITY: Probably 3-1/2 to 4 years (Klauber 1972:335).

BREEDING PERIOD: Fall in Connecticut (T. Tyning, personal communication) and Wisconsin (Messeling 1953). After emerging from hibernation (Fitch 1970). Gestation period probably about 5 1/2 to 6 months.

YOUNG BORN: Late August to September, probably biennial cycles (Klauber 1972:691). Viviparous.

NO. OF YOUNG: 5 to 17 young, typically 7 to 10 (Klauber 1972:733).

HOME RANGE/MOVEMENT: Females return to hibernation dens to give birth to young. Hibernation dens may be used year after year. Home ranges and favored refuges probably exist, but few investigations have been conducted (Klauber 1972:606-607).

FOOD HABITS/PREFERENCES: Prefers warm-blooded prey. Small mammals account for 87 percent of prey taken (Uhler et al. 1939), particularly mice, but includes rabbits, shrews, chipmunks, squirrels, bats, songbirds, and other snakes. Forages at night (Kimball 1978).

COMMENTS: Extirpated from much of its former range by man; overcollection and habitat disturbance are serious threats to *Crotalus horridus* in the Northeast. Danger to humans is grossly exaggerated.

KEY REFERENCES: Anderson 1965, Collins and Knight 1980, Klauber 1972, Wright and Wright 1957.

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BIRDS

This section provides information on the life history, distribution, and habitat associations of birds in New England. Nomenclature is from the 6th edition of the *Checklist of North American Birds* (American Ornithologists' Union 1983), and species are arranged in phylogenetic order. A.O.U. (American Ornithologists' Union) numbers are also provided; originally used to standardize the marking of collected sets of eggs, they have long been used to code bird species' names. The increased use of computer data bases makes these numbers vitally important today. All inland species are included, as are marshland birds that occur along the Atlantic Coast. We have omitted the strictly marine species, but have included some species usually associated with the coast in New England but that also occur inland, such as the Yellow-crowned Night Heron *(Nycticorax violaceus),* Northern Pintail (*Anas acuta*), and Herring Gull (*Larus argentatus*).

Information in this section comes from extensive literature searches, reviews by acknowledged experts, and, for forests birds particularly, continuing research. Birds are by far the best known class of vertebrates included in this publication—New England has a rich avifauna that has been studied for many years by eminent ornithologists. The dedication that drove William Brewster, Edward Howe Forbush, and Ludlow Griscom continues to the present day; New England's birdlife has probably been studied more fully than that of any other region in the continental United States.

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SPECIES OCCURRENCE AND UTILIZATION, BY HABITAT
FORESTED

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Great Blue Heron *Ardea herodias*	Undisturbed traditional rookery	B																	●																												
			BF																																													
			W																																													
			WF																																													
	Green-backed Heron *Butorides striatus*		B														●		●	●																												
			BF																																													
			W																																													
			WF																																													
	Wood Duck *Aix sponsa*	Trees at least 16" dbh with large cavities and 4" diameter entrance holes	B																	●																												
			BF																																													
			W																																													
			WF																																													
	American Black Duck *Anas rubripes*	Wooded wetlands, stream banks (inland)	B																																													
			BF																																													
			W																																													
			WF																																													
	Common Goldeneye *Bucephala clangula*	Cavity trees with minimum dbh of 20"; clear, cold, shallow water	B											●						●				●								●								●				●				
			BF																																													
			W																																													
			WF																																													
	Bufflehead *Bucephala albeola*	Cavity trees, usually with holes made by flickers or pileated woodpeckers	B																																													
			BF																																													
			W																																													
			WF																																													
	Hooded Merganser *Lophodytes cucullatus*	Undisturbed wooded areas with cavity trees (15" dbh min.); clear fresh water	B											●						●												●								●								
			BF																																													
			W																																													
			WF																																													
	Common Merganser *Mergus merganser*	Large cavity trees at water's edge	B											●						●																												
			BF																																													
			W																																													
			WF																																													
	Turkey Vulture *Cathartes aura*	Forest clearings	B																							●																						
			BF																																													
			W																																													
			WF																																													
	Bald Eagle *Haliaeetus leucocephalus*	Large, undisturbed water bodies containing fish, large living trees near shore	B																																													
			BF																																													
			W																																													
▲			WF																																													
	Sharp-shinned Hawk *Accipiter striatus*	Extensive undisturbed open mixed woodlands	B											●	●	●											●	●											●	●									
			BF											●	●	●											●	●											●	●									
			W											●	●	●											●	●											●	●									
			WF											●	●	●											●	●											●	●									

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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Cooper's Hawk *Accipiter cooperii*		B																				●	●			●	●																				
			BF																				●	●			●	●																				
			W																				●	●			●	●																				
			WF																				●	●			●	●																				
	Northern Goshawk *Accipiter gentilis*	Extensive mature mixed woodlands	B							●	●			●	●																																
			BF											●	●																																
			W																																												
			WF																																												
	Red-shouldered Hawk *Buteo lineatus*	Cool, moist, mature forest, wooded wetlands	B							●	●								●	●																												
			BF																●	●																												
			W																																												
			WF																																												
	Broad-winged Hawk *Buteo platypterus*	Extensive woodlands with roads or clearings	B							●	●			●	●				●	●							●	●																				
			BF																																												
			W																																												
			WF																																												
	Red-tailed Hawk *Buteo jamaicensis*	Mature forest-field ecotone	B																									●	●																				
			BF														●																															
			W																																												
			WF														●																															
	Golden Eagle *Aquila chrysaetos*	Cliffs and wide expanses of open land	B																																												
			BF																																												
			W																																												
			WF																																												
	American Kestrel *Falco sparverius*	Tall trees with cavities (dbh at least 12"); open country with low relief	B																																												
			BF																																												
			W																																												
			WF																																												
	Merlin *Falco columbarius*	Natural cavities or old woodpecker holes in open woodlands	B																																		●	●									
			BF																																		●	●									
			W																																		●	●									
			WF																																		●	●									
▲	Peregrine Falcon *Falco peregrinus*	High cliffs	B																																												
			BF																																												
			W																																												
			WF																																												
	Spruce Grouse *Dendragapus canadensis*	Coniferous forest	B																										●	●	●						●	●	●		●	●	●				
			BF																										●	●	●						●	●	●		●	●	●				
			W																										●	●	●						●	●	●		●	●	●				
			WF																										●	●	●						●	●	●		●	●	●				
	Ruffed Grouse *Bonasa umbellus*	Fallen logs amidst dense saplings	B		●																																											
			BF		●																																											
			W		●	●	●																																							
			WF		●	●	●																																							

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Wild Turkey *Meleagris gallopavo*	Open, mast-producing woodlands, large conifers for roosting, woodland clearings	B																						●		●	●																				
			BF																						●																							
			W											●	●	●							●	●			●	●																				
			WF											●	●	●							●	●			●	●																				
	Northern Bobwhite *Colinus virginianus*	Brushy field edges, well-drained sandy or loamy soils	B																						●																							
			BF																						●																							
			W																						●			●																				
			WF																						●			●																				
	American Woodcock *Scolopax minor*	Fertile mosit soil containing earthworms, clearings and dense swales	B	●	●								●					●																														
			BF																																													
			W																																													
			WF																																													
	Mourning Dove *Zenaida macroura*	Open land with bare ground	B																							●	●	●																				
			BF																																													
			W																																													
			WF																																													
	Black-billed Cuckoo *Coccyzus erythropthalmus*	Low, dense thickets	B																		●			●				●																				
			BF																		●			●				●																				
			W																																													
			WF																																													
	Yellow-billed Cuckoo *Coccyzus americanus*	Low, dense thickets	B																						●			●																				
			BF																						●			●																				
			W																																													
			WF																																													
	Eastern Screech-Owl *Otus asio*	Cavity trees (12" dbh minimum)	B																●	●																												
			BF														●		●	●																												
			W																●	●																												
			WF														●		●	●																												
	Great Horned Owl *Bubo virginianus*	Large abandoned hawk nests, large tree cavities	B																●	●																									●	●
			BF																																													
			W																																													
			WF																																													
	Northern Hawk-Owl *Surnia ulula*	Open coniferous or mixed woodland, burns with standing stubs	B																																													
			BF																																													
			W																																		●	●	●									
			WF																																		●	●	●									
	Barred Owl *Strix varia*	Cool, damp lowlands; cavity trees with minimum dbh of 20"	B												●					●								●																				
			BF												●					●								●																				
			W												●					●								●																				
			WF												●					●								●																				
	Great Gray Owl *Strix nebulosa*	Meadows, swamps near woodlands	B																																													
			BF																																													
			W																	●																												
			WF														●												●																			

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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Long-eared Owl *Asio otus*	Dense conifer thickets in open country	B																															●	●											●	●
			BF																												●																
			W																															●	●											●	●
			WF																												●																
	Boreal Owl *Aegolius funereus*	Cavity trees, often with large woodpecker holes	B																																													
			BF																																													
			W																																													
			WF																																													
	Northern Saw-whet Owl *Aegolius acadicus*	Cavity trees with minimum dbh of 12" near forest clearings	B											●	●	●			●	●																								●	●			●	●
			BF									●					●																										●	●			●	●
			W											●	●	●			●	●							●	●							●	●							●	●			●	●
			WF														●																										●	●			●	●
	Common Nighthawk *Chordeiles minor*		B																																													
			BF																																													
			W																																													
			WF																																													
	Whip-poor-will *Caprimulgus vociferus*	Ungrazed woodlands with openings	B						●				●									●				●								●															
			BF						●				●									●				●								●															
			W																																													
			WF																																													
	Ruby-throated Hummingbird *Archilochus colubris*	Flowers, preferably red	B											●	●	●			●	●			●	●																				●	●				
			BF					●				●		●	●	●			●	●			●	●																				●	●				
			W																																													
			WF																																													
	Red-headed Woodpecker *Melanerpes erythrocephalus*	Cavity trees in savanna or open country	B																●	●							●	●																				
			BF																●	●							●	●																				
			W																●	●							●	●																				
			WF																●	●							●	●																				
	Red-bellied Woodpecker *Melanerpes carolinus*	Extensive mature woodlands with dead trees or trees with large dead limbs	B																	●								●																				
			BF																	●								●																				
			W																	●								●																				
			WF																	●								●																				
	Yellow-bellied Sapsucker *Sphyrapicus varius*	Trees with minimal dbh of 10" especially aspens containing sound decayed wood	B			●	●																																									
			BF			●	●																																									
			W																																													
			WF																																													
	Downy Woodpecker *Picoides pubescens*	Trees, limbs with decay column (minimum dbh 6")	B											●	●	●			●	●							●	●																				
			BF											●	●	●			●	●							●	●																				
			W											●	●	●			●	●							●	●																				
			WF											●	●	●			●	●							●	●																				
	Hairy Woodpecker *Picoides villosus*	Trees, limbs with decay column (minimum dbh 10")	B											●	●	●			●	●																												
			BF											●	●	●			●	●																												
			W											●	●	●			●	●																												
			WF											●	●	●			●	●																												

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Three-toed Woodpecker *Picoides tridactylus*	Spruce, fir trees with column of decayed wood (minimum dbh 12"); dead trees with loose bark	B																												●	●																
			BF																												●	●																
			W																												●	●																
			WF																												●	●																
	Black-backed Woodpecker *Picoides arcticus*	**Spruce, fir trees with column of decayed wood (minimum dbh 10"); dead trees with loose bark, often near water**	B																												●	●							●	●			●	●				
			BF																												●	●							●	●			●	●				
			W																												●	●							●	●			●	●				
			WF																												●	●							●	●			●	●				
	Northern Flicker *Colaptes auratus*	Open areas; trees with column of decayed wood (minimum dbh 12"), forest edges	B																								●	●																				
			BF	●				●				●													●								●															
			W																																													
			WF																						●								●															
	Pileated Woodpecker *Dryocopus pileatus*	Mature forest; trees with column of decayed wood at least 20" dbh	B												●	●				●				●				●								●												
			BF												●	●				●				●				●								●												
			W												●	●				●				●				●								●												
			WF												●	●				●				●				●								●												
	Olive-sided Flycatcher *Contopus borealis*	Low, wet coniferous forest, bog, etc. with high song perch	B																												●										●	●								
			BF																												●										●	●								
			W																																													
			WF																																													
	Eastern Wood-Pewee *Contopus virens*	Forest edge or open woods	B																																													
			BF																																													
			W																																													
			WF																																													
	Yellow-bellied Flycatcher *Empidonax flaviventris*	Low, wet coniferous forest	B																												●								●				●	●						
			BF																												●								●				●	●						
			W																																													
			WF																																													
	Acadian Flycatcher *Empidonax virescens*	Mature woodlands with openings in the canopy	B																																													
			BF																																													
			W																																													
			WF																																													
	Alder Flycatcher *Empidonax alnorum*	Thickets, low shrubs and clearings	B														●																															
			BF														●																															
			W																																													
			WF																																													
	Willow Flycatcher *Empidonax traillii*	Low deciduous trees and shrubs with clearings, thick hardwood seedlings	B									●																																				
			BF									●																																				
			W																																													
			WF																																													
	Least Flycatcher *Empidonax minimus*	Open deciduous or mixed forest, edges	B										●	●	●	●		●								●	●	●																				
			BF										●	●	●	●		●								●	●	●																				
			W																																													
			WF																																													

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Eastern Phoebe *Sayornis phoebe*	Exposed perches; cliffs or ledges in streamside clearings, woodland edges	B																																													
			BF																																													
			W																																													
			WF																																													
	Great Crested Flycatcher *Myiarchus crinitus*	Mature cavity trees, deciduous forest, edges	B																																													
			BF																																													
			W																																													
			WF																																													
	Eastern Kingbird *Tyrannus tyrannus*	Clearings, fields, orchards	B																																													
			BF																																													
			W																																													
			WF																																													
	Purple Martin *Progne subis*	Martin houses near ponds, lakes	B																																													
			BF																																													
			W																																													
			WF																																													
	Tree Swallow *Tachycineta bicolor*	Cavity trees (minimum dbh 10"); open areas, especially near water	B																●	●																												
			BF													●																															
			W																																													
			WF																																													
	Northern Rough-winged Swallow *Stelgidopteryx serripennis*	Sandy or clay banks stabilized by a grassy, overhanging top	B																																													
			BF																																													
			W																																													
			WF																																													
	Bank Swallow *Riparia riparia*	Sandy or clay banks stabilized by a grassy overhang	B																																													
			BF																																													
			W																																													
			WF																																													
	Cliff Swallow *Hirundo pyrrhonota*	Open areas; mud; vertical wall with an overhang	B																																													
			BF																																													
			W																																													
			WF																																													
	Barn Swallow *Hirundo rustica*	Abandoned or little-used buildings	B																																													
			BF																																													
			W																																													
			WF																																													
	Gray Jay *Perisoreus canadensis*	Coniferous forests	B																																			●	●	●		●	●	●				
			BF																																			●	●	●		●	●	●				
			W																																			●	●	●		●	●	●				
			WF																																			●	●	●		●	●	●				
	Blue Jay *Cyanocitta cristata*		B						●				●					●				●				●	●	●																		●	●	●
			BF																						●	●	●																				
			W																						●	●	●																				
			WF																						●	●	●																				

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	American Crow *Corvus brachyrhynchos*		B																								●								●	●												
			BF																																													
			W																																													
			WF																																													
	Common Raven *Corvus corax*	Cliffs	B																																													
			BF																																													
			W																																													
			WF																																													
	Black-capped Chickadee *Parus atricapillus*	**Cavity trees or stubs in small woodlands; clearings or open woodlands**	B												●					●																												
			BF												●					●																												
			W												●					●																												
			WF												●					●																												
	Boreal Chickadee *Parus hudsonicus*	Softwood snags, stubs	B																														●	●							●	●			●	●				
			BF																														●	●							●	●			●	●				
			W																														●	●							●	●			●	●				
			WF																														●	●							●	●			●	●				
	Tufted Titmouse *Parus bicolor*	Cavity trees at least 8" dbh	B																							●	●	●																				
			BF																							●	●	●																				
			W																							●	●	●																				
			WF																							●	●	●																				
	Red-breasted Nuthatch *Sitta canadensis*	Cavity trees in mixed or coniferous woods (minimum dbh 12")	B																												●	●			●	●			●	●			●	●			●	●
			BF																												●	●			●	●			●	●			●	●			●	●
			W																												●	●			●	●			●	●			●	●			●	●
			WF																												●	●			●	●			●	●			●	●			●	●
	White-breasted Nuthatch ***Sitta carolinensis***	Cavity trees in hardwoods or mixed woods (minimum dbh 12")	B											●	●	●											●	●																				
			BF											●	●	●											●	●																				
			W											●	●	●											●	●																				
			WF											●	●	●											●	●																				
	Brown Creeper *Certhia americana*	Woodlands containing trees with sloughing or loose bark	B																																												
			BF																																													
			W																																													
			WF																																													
	Carolina Wren *Thryothorus ludovicianus*	Cavity trees amid brushy vegetation, thickets, swamps	B															●	●	●																												
			BF															●	●	●																												
			W															●	●	●																												
			WF															●	●	●																												
	House Wren *Troglodytes aedon*	Cavity trees, shrubs	B																																													
			BF																																													
			W																																													
			WF																																													
	Winter Wren *Troglodytes troglodytes*	Moist, mixed or coniferous woodlands with down logs; low woody vegetation	B																●	●																												
			BF																●	●																												
			W																																													
			WF																																													

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Golden-crowned Kinglet *Regulus satrapa*	Dense conifer thickets or stands, esp. spruce	B																																			●	●	●		●	●	●				
			BF																																			●	●	●		●	●	●				
			W																																													
			WF																																													
	Ruby-crowned Kinglet *Regulus calendula*	Conifer stands, or mixed stands with a predominance of softwoods, esp. spruce or fir	B																											●	●	●						●	●	●		●	●	●				
			BF																											●	●	●						●	●	●		●	●	●				
			W																																													
			WF																																													
	Blue-gray Gnatcatcher *Polioptila caerulea*	Open deciduous woodland	B															●	●	●							●	●																				
			BF															●	●	●							●	●																				
			W																																													
			WF																																													
	Eastern Bluebird *Sialia sialis*	Low cavities, open country	B									●													●																							
			BF									●													●																							
			W																																													
			WF																																													
	Veery *Catharus fuscescens*	Moist woodlands with understory of low trees and shrubs	B										●					●	●	●																												
			BF										●					●	●	●																												
			W																																													
			WF																																													
	Gray-cheeked Thrush *Catharus minimus*	Young coniferous forest at high elevations	B																																								●	●					
			BF																																								●	●					
			W																																													
			WF																																													
	Swainson's Thrush *Catharus ustulatus*	Coniferous or mixed forest	B									●																			●									●					●					
			BF									●																			●									●					●					
			W																																													
			WF																																													
	Hermit Thrush *Catharus guttatus*	Coniferous or mixed woodlands with dense undergrowth	B													●																			●	●			●	●								●	
			BF													●																			●	●			●	●								●	
			W																							●	●																					
			WF																							●	●																					
	Wood Thrush *Hylocichla mustelina*	Cool, moist, mature deciduous or mixed forest	B											●	●	●											●	●																				
			BF											●	●	●											●	●																				
			W																																													
			WF																																													
	American Robin *Turdus migratorius*		B																																													
			BF																																													
			W																																													
			WF																																													
	Gray Catbird *Dumetella carolinensis*	Shrubs, thickets in open country or forest understory	B																	●					●																							
			BF																	●					●																							
			W																																													
			WF																																													

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Northern Mockingbird *Mimus polyglottos*	Low thickets; high perches; persistent fruits	B														●																															
			BF														●																															
			W														●																															
			WF														●																															
	Brown Thrasher *Toxostoma rufum*	Hardwood forest-field ecotone	B																					●																								
			BF																					●																								
			W																					●																								
			WF																					●																								
	Bohemian Waxwing *Bombycilla garrulus*	Open country, shrubs, trees, thickets with persistent fruits (winter)	B																																													
			BF																																													
			W																																													
			WF																																													
	Cedar Waxwing *Bombycilla cedrorum*	Open country with scattered trees, thickets with persistent fruits (winter)	B														●																															
			BF					●									●																															
			W														●																															
			WF														●																															
	Northern Shrike *Lanius excubitor*	Scattered trees or shrubs in an open country	B																																													
			BF																																													
			W																																													
			WF																																													
	Loggerhead Shrike *Lanius ludovicianus*	Open country with short grasses, scattered trees, shrubs	B																																													
			BF																																													
			W																																													
			WF																																													
	European Starling *Sturnus vulgaris*	Cavity trees with 10" minimum dbh	B																																													
			BF																																													
			W																																													
			WF																																													
	White-eyed Vireo *Vireo griseus*	Low shrubs, thickets	B														●																															
			BF														●																															
			W																																													
			WF																																													
	Solitary Vireo *Vireo solitarius*	Mixed or predominantly coniferous woodland	B																															●	●			●	●			●	●			●	●
			BF																															●	●			●	●			●	●			●	●
			W																																													
			WF																																													
	Yellow-throated Vireo *Vireo flavifrons*	Mature deciduous forest	B																●	●							●	●																				
			BF																●	●							●	●																				
			W																																													
			WF																																													
	Warbling Vireo *Vireo gilvus*	Scattered deciduous trees, shade trees	B																●	●																												
			BF																●	●																												
			W																																													
			WF																																													

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Philadelphia Vireo *Vireo philadelphicus*	Hardwood forest edges	B					●																																								
			BF					●																																								
			W																																													
			WF																																													
	Red-eyed Vireo *Vireo olivaceus*		B										●	●	●	●																																
			BF									●	●	●	●	●																																
			W																																													
			WF																																													
	Blue-winged Warbler *Vermivora pinus*	Old fields with scattered shrubs and small trees	B					●																	●																							
			BF					●																	●																							
			W																																													
			WF																																													
	Golden-winged Warbler *Vermivora chrysoptera*	Open areas with saplings in deciduous woodlands	B																																													
			BF																																													
			W																																													
			WF																																													
	Tennessee Warbler *Vermivora peregrina*	Brushy, semi-open country	B					●				●																																				
			BF					●				●																																				
			W																																													
			WF																																													
	Nashville Warbler *Vermivora ruficapilla*	Scattered trees interspersed with brush, thickets, slash	B	●				●																														●												
			BF	●				●																														●												
			W																																													
			WF																																													
	Northern Parula *Parula americana*	Presence of bearded lichen	B											●	●	●																						●	●	●		●	●	●					
			BF											●	●	●																						●	●	●		●	●	●					
			W																																													
			WF																																													
	Yellow Warbler *Dendroica petechia*	Scattered small trees or dense shrubs, esp. near water	B														●												●																			
			BF														●												●																			
			W																																													
			WF																																													
	Chestnut-sided Warbler *Dendroica pensylvanica*	Sprouts and brush at wood margins; hardwood seedling stands	B	●				●				●					●																															
			BF	●				●				●					●																															
			W																																													
			WF																																													
	Magnolia Warbler *Dendroica magnolia*	Young stands of spruce or fir, sometimes of hemlock	B																											●							●	●			●	●						
			BF																											●							●	●			●	●						
			W																																													
			WF																																													
	Cape May Warbler *Dendroica tigrina*	Spruce forest	B																												●								●				●					
			BF																												●								●				●					
			W																																													
			WF																																													

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Black-throated Blue Warbler *Dendroica caerulescens*	Hardwood or mixed woodlands with well-developed understory	B											●	●	●																																
			BF											●	●	●																																
			W																																													
			WF																																													
	Yellow-rumped Warbler *Dendroica coronata*	Coniferous trees (summer), bayberry thickets (winter)	B															●	●	●																		●	●											
			BF															●	●	●																														
			W																																													
			WF																																													
	Black-throated Green Warbler *Dendroica virens*	Coniferous or mixed woodlands	B											●	●	●																															●	●
			BF											●	●	●																															●	●
			W																																													
			WF																																													
	Blackburnian Warbler *Dendroica fusca*	Coniferous forest, mixed woodlands	B																				●	●							●	●							●	●			●	●				
			BF																				●	●							●	●							●	●			●	●				
			W																																													
			WF																																													
	Pine Warbler *Dendroica pinus*	Pine forest	B																															●														
			BF																															●														
			W																																													
			WF																																													
	Prairie Warbler *Dendroica discolor*	Coniferous cover in old fields, hardwood saplings, slash	B					●																	●																							
			BF					●																	●																							
			W																																													
			WF																																													
	Palm Warbler *Dendroica palmarum*	Scattered trees, thick shrub growth	B																																													
			BF																																													
			W																																													
			WF																																													
	Bay-breasted Warbler *Dendroica castanea*	Thick stands of spruce, fir, spruce-fir	B																												●	●							●	●			●	●				
			BF																												●	●							●	●			●	●				
			W																																													
			WF																																													
	Blackpoll Warbler *Dendroica striata*	Stunted spruce, esp. at high elevations	B																																			●				●						
			BF																																			●				●						
			W																																													
			WF																																													
	Cerulean Warbler *Dendroica cerulea*	Mature deciduous woodland	B																							●																						
			BF																							●																						
			W																																													
			WF																																													
	Black-and-white Warbler *Mniotilta varia*		B												●	●												●																				
			BF												●	●												●																				
			W																																													
			WF																																													

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	American Redstart *Setophaga ruticilla*		B										●															
			BF										●															
			W																									
			WF																									
	Prothonotary Warbler ***Protonotaria citrea***	Tree cavities in moist hardwood forest	B																	●								
			BF																	●								
			W																									
			WF																									
	Worm-eating Warbler *Helmitheros vermivorus*	Well-developed understory	B																								●	
			BF																								●	
			W																									
			WF																									
	Ovenbird *Seiurus aurocapillus*		B										●	●	●	●						●	●	●			●	●
			BF										●	●	●	●						●	●	●			●	●
			W																									
			WF																									
	Northern Waterthrush *Seiurus noveboracensis*	Cool, shaded, wet ground with shallow pools	B																●	●								
			BF																●	●								
			W																									
			WF																									
	Louisiana Waterthrush *Seiurus motacilla*	Woodlands with flowing water	B																●	●								
			BF																●	●								
			W																									
			WF																									
	Mourning Warbler *Oporornis philadelphia*	Extensive stands hardwood regeneration	B	●				●				●					●											
			BF	●				●				●					●											
			W																									
			WF																									
	Common Yellowthroat *Geothlypis trichas*		B									●					●			●					●			●
			BF									●					●			●					●			●
			W																									
			WF																									
	Hooded Warbler *Wilsonia citrina*	Dense understory	B														●											
			BF														●											
			W																									
			WF																									
	Wilson's Warbler *Wilsonia pusilla*	Cold shrub swamps, bogs	B																									
			BF																									
			W																									
			WF																									
	Canada Warbler *Wilsonia canadensis*	Dense deciduous or ericaceous understory	B																				●	●				
			BF																				●	●				
			W																									
			WF																									

SPECIES	Seasonal use	Balsam fir				Eastern white pine				Red spruce - Balsam fir				Red spruce				Eastern hemlock			
		S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
American Redstart *Setophaga ruticilla*	B																				
	BF																				
	W																				
	WF																				
Prothonotary Warbler ***Protonotaria citrea***	B																				
	BF																				
	W																				
	WF																				
Worm-eating Warbler *Helmitheros vermivorus*	B																				
	BF																				
	W																				
	WF																				
Ovenbird *Seiurus aurocapillus*	B																				
	BF																				
	W																				
	WF																				
Northern Waterthrush *Seiurus noveboracensis*	B																				
	BF																				
	W																				
	WF																				
Louisiana Waterthrush *Seiurus motacilla*	B																				
	BF																				
	W																				
	WF																				
Mourning Warbler *Oporornis philadelphia*	B																				
	BF																				
	W																				
	WF																				
Common Yellowthroat *Geothlypis trichas*	B																				
	BF																				
	W																				
	WF																				
Hooded Warbler *Wilsonia citrina*	B																				
	BF																				
	W																				
	WF																				
Wilson's Warbler *Wilsonia pusilla*	B																				
	BF																				
	W																				
	WF																				
Canada Warbler *Wilsonia canadensis*	B		●	●	●						●	●	●		●	●	●				
	BF		●	●	●						●	●	●		●	●	●				
	W																				
	WF																				

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Yellow-breasted Chat *Icteria virens*	Dense thickets and vines with scattered young trees, often near water	B																																													
			BF																																													
			W																																													
			WF																																													
	Scarlet Tanager *Piranga olivacea*		B											■	■	■										■	■	■																				
			BF											■	■	■										■	■	■																				
			W																																													
			WF																																													
	Northern Cardinal *Cardinalis cardinalis*	Thickets, vines	B														■																															
			BF														■																															
			W														■																															
			WF														■																															
	Rose-breasted Grosbeak *Pheucticus ludovicianus*	Forest-field ecotone, thickets, sapling stands of hardwoods	B										■									■				■																						
			BF										■									■				■																						
			W																																													
			WF																																													
	Indigo Bunting *Passerina cyanea*	Forest-field ecotones	B																																													
			BF																																													
			W																																													
			WF																																													
	Rufous-sided Towhee *Pipilo erythrophthalmus*	Dense, brushy understory, well-drained soils	B																		■	■			■	■	■						■															
			BF																		■	■			■	■	■						■															
			W																																													
			WF																																													
	American Tree Sparrow *Spizella arborea*	Open country, weed fields (winter)	B																																													
			BF																																													
			W																																													
			WF																																													
	Chipping Sparrow *Spizella passerina*	Clearings with bare ground, conifers or thorny shrubs	B																						■								■															
			BF																						■								■															
			W																																													
			WF																																													
	Field Sparrow *Spizella pusilla*	Old fields	B																																													
			BF																																													
			W																																													
			WF																																													
	Fox Sparrow *Passerella iliaca*		B																																													
			BF																																													
			W																						■																							
			WF																						■																							
	Song Sparrow *Melospiza melodia*		B														■																															
			BF														■																															
			W														■																															
			WF														■																															

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce - Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Lincoln's Sparrow *Melospiza lincolnii*	Brushy thickets 4 to 8 feet high with grass or sedge openings	B																																													
			BF																																													
			W																																													
			WF																																													
	Swamp Sparrow *Melospiza georgiana*		B																																													
			BF																																													
			W																																													
			WF																																													
	White-throated Sparrow *Zonotrichia albicollis*		B																																													
			BF																																													
			W																																													
			WF																																													
	Dark-eyed Junco *Junco hyemalis*	Woods road with cut bank, uprooted tree, etc. for nest site	B																									●								●				●								
			BF																									●								●				●								
			W																																													
			WF																																													
	Red-winged Blackbird *Agelaius phoeniceus*	Grasslands, marshes	B																																													
			BF																																													
			W																																													
			WF																																													
	Rusty Blackbird *Euphagus carolinus*	Northern woodland swamps, alder swales	B																																							●	●	●				
			BF																																							●	●	●				
			W																																													
			WF																																													
	Common Grackle *Quiscalus quiscula*	Wet, open country, shrub swamps, pond edges	B														●																															
			BF														●																															
			W																																													
			WF																																													
	Brown-headed Cowbird *Molothrus ater*		B																																													
			BF																																													
			W																																													
			WF																																													
	Orchard Oriole *Icterus spurius*	Open country with scattered deciduous trees	B																																													
			BF																																													
			W																																													
			WF																																													
	Northern Oriole *Icterus galbula*	Tall scattered deciduous (preferably elm) trees	B																																													
			BF																																													
			W																																													
			WF																																													
	Pine Grosbeak *Pinicola enucleator*	Northern conifer forest	B																																		●	●	●									
			BF																																●	●	●	●								
			W																																													
			WF																																													

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Purple Finch *Carpodacus purpureus*	Coniferous trees	B																										●								●				●							
			BF																										●								●				●							
			W																																		●											
			WF																																		●											
	House Finch *Carpodacus mexicanus*	Open ground with low seed-producing plants	B																																													
			BF																																													
			W																																													
			WF																																													
	Red Crossbill *Loxia curvirostra*	Northern coniferous trees	B																																				●	●			●	●				
			BF																																				●	●			●	●				
			W																																				●	●			●	●				
			WF																																				●	●			●	●				
	White-winged Crossbill *Loxia leucoptera*	Northern coniferous trees	B																																				●	●			●	●				
			BF																																				●	●			●	●				
			W																																				●	●			●	●				
			WF																																				●	●			●	●				
	Common Redpoll *Carduelis flammea*	Open country	B																																													
			BF																																													
			W					●																																						
			WF					●																																						
	Hoary Redpoll *Carduelis hornemanni*	Open country	B																																													
			BF																																													
			W					●																																						
			WF					●				●																																		
	Pine Siskin *Carduelis pinus*	Conifers	B																											●	●	●						●	●	●		●	●	●				
			BF																											●	●	●						●	●	●		●	●	●				
			W																																													
			WF																																													
	American Goldfinch *Carduelis tristis*	Open, weedy fields with scattered small trees	B														●																															
			BF														●																															
			W															●	●	●																												
			WF															●	●	●																												
	Evening Grosbeak *Coccothraustes vespertinus*	Spruce and fir forest (breeding season).	B																																								●	●	●				
			BF																																								●	●	●				
			W																																													
			WF																																													
			B																																													
			BF																																													
			W																																													
			WF																																													
			B																																													
			BF																																													
			W																																													
			WF																																													

SPECIES OCCURRENCE AND UTILIZATION, BY HABITAT
NONFORESTED

				Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
Local occurrence	SPECIES	Special habitat needs	Seasonal use	Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Common Loon *Gavia immer*	Large undisturbed bodies of water with stable water levels and islands.	B																●											
			BF																●											
			W																						●					
			WF																						●					
	Pied-billed Grebe *Podilymbus podiceps*	Marshes with water and emergent vegetation.	B											●	●															
			BF											●	●															
			W																						●					
			WF																						●					
	American Bittern *Botaurus lentiginosus*	Undisturbed tall marsh vegetation.	B											●																
			BF											●																
			W																											
			WF																											
	Least Bittern *Ixobrychus exilis*	Deep marshes with clumps of emergent vegetation.	B											●																
			BF											●																
			W																											
			WF																											
	Great Blue Heron *Ardea herodias*	Tall trees.	B											●																
			BF											●																
			W																											
			WF																											
	Green-backed Heron *Butorides striatus*		B											●																
			BF											●																
			W																											
			WF																											
	Black-crowned Night-Heron *Nycticorax nycticorax*		B													●														
			BF																				●							
			W																				●							
			WF																				●							
	Yellow-crowned Night-Heron *Nycticorax violaceus*		B													●							●							
			BF																				●							
			W																											
			WF																											
	Glossy Ibis *Plegadis falcinellus*		B													●														
			BF																											
			W																											
			WF																											
	Mute Swan *Cygnus olor*	Shallow ponds, rivers with abundant aquatic vegetation.	B																				●							
			SF																				●							
			W																				●							
			WF																				●							
	Canada Goose *Branta canadensis*		B											●																
			BF											●																
			W																				●							
			WF																				●							

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Wood Duck *Aix sponsa*	Trees at least 16" dbh with large cavities and 4" diameter entrance holes.	B																			●								
			BF																			●								
			W																											
			WF																											
	Green-winged Teal *Anas crecca*		B											●																
			BF											●																
			W																											
			WF																											
	American Black Duck *Anas rubripes*		B											●																
			BF											●																
			W											●									●							
			WF											●									●							
	Mallard *Anas platyrhynchos*		B											●																
			BF											●																
			W																											
			WF																											
	Northern Pintail *Anas acuta*	Drakes need mudbanks or exposed shorelines.	B																											
			BF																											
			W																				●							
			WF																				●							
	Blue-winged Teal *Anas discors*		B											●																
			BF											●																
			W																											
			WF																											
	Northern Shoveler *Anas clypeata*	Shallow water with muddy bottom, surrounded by dry grassy areas.	B											●																
			BF											●																
			W																				●							
			WF																				●							
	Gadwall *Anas strepera*	Moderate to large bodies of water, with submerged aquatic plants.	B												●															
			BF												●															
			W																											
			WF																											
	American Wigeon *Anas americana*		B																●											
			BF																●											
			W																				●							
			WF																				●							
	Canvasback *Aythya valisineria*	Stretches of open water and emergent vegetation.	B																											
			BF																											
			W																						●					
			WF																						●					
	Ring-necked Duck *Aythya collaris*	Expanse of open water.	B																●											
			BF																●											
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Common Goldeneye *Bucephala clangula*	Cavity trees with minimum dbh of 20"; clear, cold, shallow water.	B																											
			BF																											
			W																●											
			WF																●											
	Bufflehead *Bucephala albeola*		B																											
			BF																											
			W																											
			WF																											
	Hooded Merganser *Lophodytes cucullatus*	Undisturbed wooded areas with cavity trees (15" dbh min.); clear fresh water.	B																●											
			BF																●											
			W																●											
			WF																●											
	Common Merganser *Mergus merganser*		B																●											
			BF																●											
			W																											
			WF																											
	Red-breasted Merganser *Mergus serrator*		B																●											
			BF																●											
			W																						●					
			WF																						●					
	Turkey Vulture *Cathartes aura*	Forest openings, fields, large stubs of dead tree trunks.	B																											
			BF		●			●																						
			W																											
			WF																											
	Osprey *Pandion haliaetus*	Clear lakes, rivers containing fish.	B																				●							
			BF																				●							
			W																											
			WF																											
▲	Bald Eagle *Haliaeetus leucocephalus*	Large, undisturbed water bodies containing fish, large living trees near shore.	B																●											
			BF																●											
			W																											
			WF																											
	Northern Harrier *Circus cyaneus*	Marshes or open country with low vegetation.	B											●																
			BF											●																
			W																											
			WF																											
	Sharp-shinned Hawk *Accipiter striatus*	Extensive undisturbed open mixed woodlands.	B																											
			BF																											
			W																											
			WF																											
	Cooper's Hawk *Accipiter cooperii*		B																											
			BF																											
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Northern Goshawk *Accipiter gentilis*	Extensive mature mixed woodlands.	B																											
			BF																											
			W																											
			WF																											
	Red-shouldered Hawk *Buteo lineatus*	Cool, moist, mature forest.	B																			●								
			BF													●						●								
			W																			●								
			WF																			●								
	Broad-winged Hawk *Buteo platypterus*	Extensive woodlands with roads or clearings.	B																											
			BF		●			●																						
			W																											
			WF																											
	Red-tailed Hawk *Buteo jamaicensis*	Mature forest-field ecotone.	B																											
			BF		●			●																						
			W																											
			WF																											
	Rough-legged Hawk *Buteo lagopus*	Open country.	B																											
			BF																											
			W		●			●															●							
			WF	●	●			●															●							
	Golden Eagle *Aquila chrysaetos*	Cliffs and wide expanses of open land.	B																								●			
			BF																											
			W																											
			WF																											
	American Kestrel *Falco sparverius*	Tall trees with cavities (dbh at least 12"); open country with low elevation.	B					●																						
			BF		●																									
			W		●																									
			WF	●	●																									
	Merlin *Falco columbarius*		B																											
			BF																											
			W																											
			WF																											
▲	Peregrine Falcon *Falco peregrinus*	High cliffs.	B																								●			
			BF																											
			W																											
			WF																				●							
	Gray Partridge *Perdix perdix*	Grasslands, grain crops.	B		●																									
			BF		●																									
			W		●																									
			WF		●																									
	Ring-necked Pheasant *Phasianus colchicus*	Cultivated fields, farmland.	B		●																									
			BF		●																									
			W				●																							
			WF	●			●																							

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Spruce Grouse *Dendragapus canadensis*	Coniferous forest.	B																											
			BF																											
			W																											
			WF																											
	Ruffed Grouse *Bonasa umbellus*	Fallen logs amidst dense saplings.	B																											
			BF																											
			W																											
			WF																											
	Wild Turkey *Meleagris gallopavo*	Open, mast-producing woodlands, large conifers for roosting, woodland clearings.	B																											
			BF																											
			W																											
			WF																											
	Northern Bobwhite *Colinus virginianus*	Brushy field edges, well-drained sandy or loamy soils.	B		●																									
			BF		●																									
			W		●																									
			WF		●																									
	King Rail *Rallus elegans*	Stable water levels.	B											●																
			BF											●																
			W																											
			WF																											
	Virginia Rail *Rallus limicola*	Wetlands with sedge and cattails.	B											●																
			BF											●																
			W											●																
			WF											●																
	Sora *Porzana carolina*		B											●																
			BF											●																
			W																											
			WF																											
	Common Moorhen *Gallinula chloropus*	Emergent vegetation in water 1 to 3 feet deep.	B											●																
			BF											●																
			W																											
			WF																											
	American Coot *Fulica americana*	Emergent vegetation in water 1 to 4 feet deep.	B												●															
			BF												●															
			W																				●		●					
			WF																				●		●					
	Killdeer *Charadrius vociferus*	Bare ground, sparse vegetation.	B	●																										
			BF	●																										
			W																											
			WF																											
	Spotted Sandpiper *Actitis macularia*		B																	●	●									
			BF																	●	●									
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Upland Sandpiper *Bartramia longicauda*		B					●																						
			BF					●																						
			W																											
			WF																											
	Common Snipe *Gallinago gallinago*	Moist organic soils, low scattered vegetation, bogs, swamps, large open spaces	B													●														
			BF													●														
			W													●														
			WF													●														
	American Woodcock ***Scolopax minor***	Fertile moist soil containing earthworms, small clearings and dense swales	B																											
			BF					●																						
			W																											
			WF																											
	Ring-billed Gull *Larus delawarensis*		B																											
			BF																											
			W																											
			WF																											
	Herring Gull *Larus argentatus*		B																											
			BF																											
			W																											
			WF																											
	Great Black-backed Gull *Larus marinus*		B																											
			BF																											
			W																											
			WF																											
	Common Tern *Sterna hirundo*		B																					●						
			BF																						●					
			W																											
			WF																											
	Black Tern *Chlidonias niger*	Fresh marsh in breeding season.	B											●	●															
			BF											●	●															
			W																											
			WF																											
	Rock Dove *Columba livia*		B																										●	●
			BF	●																										
			W																										●	●
			WF	●																										
	Mourning Dove *Zenaida macroura*	Open land with bare ground	B																											
			BF	●																										
			W																											
			WF	●																										
	Black-billed Cuckoo ***Coccyzus erythropthalmus***	Low, dense, thickets.	B																											
			BF																											
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Yellow-billed Cuckoo *Coccyzus americanus*	Low, dense, thickets.	B																											
			BF																											
			W																											
			WF																											
	Common Barn-Owl *Tyto alba*	Barns, silos, deserted buildings, tree cavities.	B																											●
			BF	●																										●
			W																											●
			WF	●																										●
	Eastern Screech-Owl *Otus asio*	Cavity trees (12" dbh minimum).	B																			●								
			BF																			●								
			W																			●								
			WF											●								●								
	Great Horned Owl *Bubo virginianus*	Large abandoned hawk nests, large tree cavities.	B																											
			BF																											
			W																											
			WF																											
	Snowy Owl *Nyctea scandiaca*	Open country	B																											
			BF																											
			W	●																				●						
			WF	●																				●						
	Northern Hawk-Owl *Surnia ulula*		B																											
			BF																											
			W														●													
			WF														●													
	Barred Owl *Strix varia*	Cool, damp lowlands; cavity trees with minimum dbh of 20".	B																			●								
			BF																			●								
			W																			●								
			WF																			●								
	Great Gray Owl *Strix nebulosa*		B																											
			BF																											
			W																											
			WF														●													
	Long-eared Owl *Asio otus*	Dense conifer thickets in open country.	B																											
			BF																											
			W																											
			WF																											
	Short-eared Owl *Asio flammeus*	Extensive open grasslands, dunes.	B																				●							
			BF																				●							
			W																				●							
			WF																				●							
	Boreal Owl *Aegolius funereus*		B																											
			BF																											
			W														●													
			WF														●													

				Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
Local occurrence	SPECIES	Special habitat needs	Seasonal use	Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Northern Saw-whet Owl *Aegolius acadicus*	Cavity trees with minimum dbh of 12".	B																											
			BF																											
			W																											
			WF																											
	Common Nighthawk *Chordeiles minor*		B																											
			BF																											
			W																											
			WF																											
	Whip-poor-will *Caprimulgus vociferus*		B																											
			BF																											
			W																											
			WF																											
	Chimney Swift *Chaetura pelagica*	Chimneys.	B																										●	●
			BF																											
			W																											
			WF																											
	Ruby-throated Hummingbird *Archilochus colubris*	Flowers, preferably red.	B																											
			BF																											
			W																											
			WF																											
	Belted Kingfisher *Ceryle alcyon*	Perches over streams, ponds; banks for nest sites.	B																							●				
			BF																			●								
			W																			●								
			WF																			●								
	Red-headed Woodpecker *Melanerpes erythrocephalus*	Cavity trees in savanna or open country.	B																											
			BF																											
			W																											
			WF																											
	Red-bellied Woodpecker *Melanerpes carolinus*	Extensive mature woodlands with dead trees or trees with large dead limbs.	B																			●								
			BF																			●								
			W																			●								
			WF																			●								
	Yellow-bellied Sapsucker *Sphyrapicus varius*	Trees with minimum dbh of 10".	B																											
			BF																											
			W							●																				
			WF							●																				
	Downy Woodpecker *Picoides pubescens*	Trees, limbs with decay column (minimum dbh 6").	B																											
			BF																											
			W																											
			WF																											
	Hairy Woodpecker *Picoides villosus*	Trees, limbs with decay column (minimum dbh 10").	B																											
			BF																											
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Three-toed Woodpecker *Picoides tridactylus*	Spruce, fir trees with decay (minimum dbh of 12"); dead trees with loose bark.	B																											
			BF																											
			W																											
			WF																											
	Black-backed Woodpecker *Picoides arcticus*	Spruce, fir trees with decay (minimum dbh of 10"); dead trees with loose bark.	B																											
			BF																											
			W																											
			WF																											
	Northern Flicker *Colaptes auratus*	Open areas; trees with heartrot (minimum dbh of 12").	B																											
			BF	●																										
			W																											
			WF	●																										
	Pileated Woodpecker *Dryocopus pileatus*	Mature forest; trees with decay at least 20" dbh.	B																											
			BF																											
			W																											
			WF																											
	Olive-sided Flycatcher *Contopus borealis*	Tall perch adjacent to low, wet thicket.	B														●													
			BF														●													
			W																											
			WF																											
	Eastern Wood-Pewee *Contopus virens*		B																			●								
			BF																			●								
			W																											
			WF																											
	Yellow-bellied Flycatcher *Empidonax flaviventris*	Low, wet coniferous forest.	B													●														
			BF													●														
			W																											
			WF																											
	Acadian Flycatcher *Empidonax virescens*	Mature, woodlands with open spaces in the canopy.	B																											
			BF																											
			W																											
			WF																											
	Alder Flycatcher *Empidonax alnorum*	Thickets, low shrubs and clearings.	B													●						●								
			BF													●						●								
			W																											
			WF																											
	Willow Flycatcher *Empidonax traillii*	Low deciduous trees and shrubs with clearings, thick hardwood seedlings.	B				●																							
			BF				●																							
			W																											
			WF																											
	Least Flycatcher *Empidonax minimus*	Open deciduous or mixed forest, edges.	B																											
			BF																											
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Eastern Phoebe *Sayornis phoebe*	Exposed perches; cliffs or ledges in streamside clearings.	B																										●	●
			BF																											
			W																											
			WF																											
	Great Crested Flycatcher *Myiarchus crinitus*	Mature cavity trees, deciduous forest, edges.	B																											
			BF																											
			W																											
			WF																											
	Eastern Kingbird *Tyrannus tyrannus*	Clearings, fields, orchards	B							●																				
			BF							●																				
			W																											
			WF																											
	Horned Lark *Eremophila alpestris*	Bare, exposed soil.	B		●																									
			BF		●																									
			W	●																										
			WF	●																										
	Purple Martin *Progne subis*	Martin houses near ponds, lakes.	B																											
			BF																											
			W																											
			WF																											
	Tree Swallow *Tachycineta bicolor*	Cavity trees (minimum dbh 10"); open areas	B																											
			BF											●																
			W																											
			WF																											
	Northern Rough-winged Swallow *Stelgidopteryx serripennis*		B																			●								
			BF	●	●																	●								
			W																											
			WF																											
	Bank Swallow *Riparia riparia*	Sandy or clay banks stabilized by a grassy overhang.	B																							●				
			BF	●																										
			W																											
			WF																											
	Cliff Swallow *Hirundo pyrrhonota*	Open areas; mud; vertical wall with an overhang	B																										●	●
			BF		●																									
			W																											
			WF																											
	Barn Swallow *Hirundo rustica*	Abandoned or little-used buildings.	B																										●	●
			BF		●																									
			W																											
			WF																											
	Gray Jay *Perisoreus canadensis*	Coniferous forests.	B																											
			BF																											
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs·	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Blue Jay *Cyanocitta cristata*		B																											
			BF																											
			W																											
			WF																											
	American Crow *Corvus brachyrhynchos*		B																											
			BF	●																										
			W																											
			WF	●																										
	Fish Crow *Corvus ossifragus*		B																											
			BF																											
			W																											
			WF																											
	Common Raven *Corvus corax*	Cliffs.	B																								●			
			BF																											
			W																											
			WF																●											
	Black-capped Chickadee *Parus atricapillus*	Cavity trees or stubs in small woodlands, clearings or open woodlands.	B																											
			BF																											
			W																											
			WF																											
	Boreal Chickadee *Parus hudsonicus*	Softwood snags, stubs.	B																											
			BF																											
			W																											
			WF																											
	Tufted Titmouse *Parus bicolor*	Cavity trees at least 8" dbh.	B																			●								
			BF																			●								
			W																			●								
			WF																			●								
	Red-breasted Nuthatch *Sitta canadensis*	Cavity trees in mixed or coniferous woods (minimum dbh 12").	B																											
			BF																											
			W																											
			WF																											
	White-breasted Nuthatch *Sitta carolinensis*	Cavity trees in hardwoods or mixed woods (minimum dbh 12").	B																											
			BF																											
			W							●																				
			WF							●																				
	Brown Creeper *Certhia americana*	Woodland trees with sloughing or loose bark.	B																											
			BF																											
			W																											
			WF																											
	Carolina Wren *Thryothorus ludovicianus*	Cavity tree amid brushy vegetation.	B																											
			BF																											
			W																											
			WF																											

				Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
Local occurrence	SPECIES	Special habitat needs	Seasonal use	Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	House Wren *Troglodytes aedon*	Cavity trees, shrubs.	B																											●
			BF																											
			W																											
			WF																											
	Winter Wren *Troglodytes troglodytes*	Moist, mixed or coniferous woodlands with down logs; low woody vegetation.	B																											
			BF																											
			W																											
			WF																											
	Sedge Wren *Cistothorus platensis*	Sedge meadows.	B										●																	
			BF										●																	
			W																											
			WF																											
	Marsh Wren *Cistothorus palustris*	Marshes.	B																				●							
			BF																				●							
			W																											
			WF																											
	Golden-crowned Kinglet *Regulus satrapa*		B																											
			BF																											
			W																											
			WF																											
	Ruby-crowned Kinglet *Regulus calendula*		B																											
			BF																											
			W																											
			WF																											
	Blue-gray Gnatcatcher *Polioptila caerulea*		B																											
			BF																											
			W																											
			WF																											
	Eastern Bluebird *Sialia sialis*	Low cavities, open country.	B							●																				
			BF							●																				
			W																											
			WF																											
	Veery *Catharus fuscescens*	Moist woodlands with understory of low trees and shrubs.	B																			●								
			BF																			●								
			W																											
			WF																											
	Gray-cheeked Thrush *Catharus minimus*	Stunted coniferous forest at high elevations.	B								●																			
			BF								●																			
			W																											
			WF																											
	Hermit Thrush *Catharus guttatus*	Coniferous or mixed woodlands with dense undergrowth.	B																											
			BF																											
			W																											
			WF																											

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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Wood Thrush *Hylocichla mustelina*	Cool, moist, mature deciduous or mixed forest	B																											
			BF																											
			W																											
			WF																											
	American Robin *Turdus migratorius*		B																											
			BF	●																										
			W																											
			WF																											
	Gray Catbird *Dumetella carolinensis*	Shrubs, thickets in open country or forest understory	B																			●								
			BF																			●								
			W																											
			WF																											
	Northern Mockingbird *Mimus polyglottos*	Low thickets; high perches; persistent fruits	B				●																							
			BF																											
			W																											
			WF																											
	Brown Thrasher *Toxostoma rufum*	Hardwood forest-field ecotone	B					●																						
			BF					●																						
			W																											
			WF																											
	Bohemian Waxwing *Bombycilla garrulus*		B																											
			BF																											
			W																											
			WF																											
	Cedar Waxwing *Bombycilla cedrorum*		B																											
			BF																											
			W																											
			WF																											
	Northern Shrike *Lanius excubitor*	Scattered trees or shrubs in open country	B																											
			BF																											
			W					●	●																					
			WF		●			●	●																					
	Loggerhead Shrike *Lanius ludovicianus*	Open country with short grasses, scattered trees, shrubs	B						●																					
			BF						●																					
			W																											
			WF																											
	European Starling *Sturnus vulgaris*	Cavity trees with 10" minimum dbh	B																											●
			BF																											
			W																											●
			WF	●																										
	White-eyed Vireo *Vireo griseus*	Low shrubs, thickets	B													●														
			BF													●														
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Yellow-throated Vireo *Vireo flavifrons*	Mature deciduous forest	B																											
			BF																											
			W																											
			WF																											
	Warbling Vireo *Vireo gilvus*	Scattered deciduous trees, shade trees	B																											
			BF																											
			W																											
			WF																											
	Philadelphia Vireo *Vireo philadelphicus*	Hardwood forest edges	B																											
			BF																											
			W																											
			WF																											
	Red-eyed Vireo *Vireo olivaceus*		B																											
			BF																											
			W																											
			WF																											
	Blue-winged Warbler *Vermivora pinus*	Old fields with scattered shrubs and small trees	B				●																							
			BF				●																							
			W																											
			WF																											
	Golden-winged Warbler *Vermivora chrysoptera*	Open areas with saplings in deciduous woodlands	B				●																							
			BF				●																							
			W																											
			WF																											
	Tennessee Warbler *Vermivora peregrina*	Brushy, semi-open country	B																											
			BF																											
			W																											
			WF																											
	Nashville Warbler *Vermivora ruficapilla*	Scattered trees interspersed with brush, thickets	B																											
			BF																											
			W																											
			WF																											
	Northern Parula *Parula americana*	Presence of bearded lichen	B																											
			BF																											
			W																											
			WF																											
	Yellow Warbler *Dendroica petechia*	Scattered small trees or dense shrubs	B																				●							
			BF																				●							
			W																											
			WF																											
	Chestnut-sided Warbler *Dendroica pensylvanica*	Sprouts and brush at wood margins; hardwood seedling stands	B																											
			BF																											
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Yellow-rumped Warbler *Dendroica coronata*	Coniferous trees (summer), bayberry thickets (winter).	B																											
			BF																											
			W																											
			WF																											
	Prairie Warbler *Dendroica discolor*	Coniferous cover in old fields.	B																											
			BF																											
			W																											
			WF																											
	Palm Warbler *Dendroica palmarum*		B														●													
			BF														●													
			W																											
			WF																											
	Bay-breasted Warbler *Dendroica castanea*	Thick stands of spruce, fir, spruce-fir.	B																											
			BF																											
			W																											
			WF																											
	Blackpoll Warbler *Dendroica striata*	Stunted spruce, esp. at high elevations.	B								●																			
			BF								●																			
			W																											
			WF																											
	Cerulean Warbler *Dendroica cerulea*		B																			●								
			BF																			●								
			W																											
			WF																											
	Black-and-white Warbler *Mniotilta varia*		B																											
			BF																											
			W																											
			WF																											
	American Redstart *Setophaga ruticilla*		B																											
			BF																											
			W																											
			WF																											
	Prothonotary Warbler *Protonotaria citrea*	Tree cavities in moist, hardwood forest.	B																			●								
			BF																			●								
			W																											
			WF																											
	Northern Waterthrush *Seiurus noveboracensis*	Cool, shaded, wet ground with shallow pools.	B																			●								
			BF																			●								
			W																											
			WF																											
	Louisiana Waterthrush *Seiurus motacilla*	Woodlands with flowing water.	B																			●								
			BF																			●								
			W																											
			WF																											

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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Mourning Warbler *Oporornis philadelphia*	Hardwood regeneration	B																											
			BF																											
			W																											
			WF																											
	Common Yellowthroat *Geothlypis trichas*		B					●								●						●								
			BF					●								●						●								
			W																											
			WF																											
	Hooded Warbler *Wilsonia citrina*	Dense understory.	B													●														
			BF													●														
			W																											
			WF																											
	Wilson's Warbler *Wilsonia pusilla*		B														●													
			BF														●													
			W																											
			WF																											
	Canada Warbler *Wilsonia canadensis*		B																											
			BF																											
			W																											
			WF																											
	Yellow-breasted Chat *Icteria virens*	Dense thickets and vines with scattered young trees, often near water.	B					●														●								
			BF					●														●								
			W																											
			WF																											
	Northern Cardinal *Cardinalis cardinalis*	Thickets, vines.	B																											
			BF																											
			W																											
			WF																											
	Rose-breasted Grosbeak *Pheucticus ludovicianus*	Forest-field ecotone, thickets, hardwood regeneration.	B																											
			BF																											
			W																											
			WF																											
	Indigo Bunting *Passerina cyanea*	Forest-field ecotones.	B																											
			BF		●																									
			W																											
			WF																											
	Rufous-sided Towhee *Pipilo erythrophthalmus*	Dense, brushy understory, well-drained soils.	B																											
			BF																											
			W																											
			WF																											
	Tree Sparrow *Spizella arborea*		B																											
			BF																											
			W																											
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Chipping Sparrow *Spizella passerina*		B						●																					
			BF						●																					
			W																											
			WF																											
	Field Sparrow *Spizella pusilla*	Old fields	B					●																						
			BF					●																						
			W		●																									
			WF		●																									
	Vesper Sparrow *Pooecetes gramineus*	Open country with short herbaceous vegetation, conspicuous perches	B		●																									
			BF		●																									
			W																											
			WF																											
	Savannah Sparrow *Passerculus sandwichensis*	Herbaceous cover of moderate height	B		●																		●							
			BF		●																		●							
			W		●																		●							
			WF		●																		●							
	Grasshopper Sparrow *Ammodramus savannarum*	Continuous tall herbaceous cover, conspicuous perches	B		●																									
			BF		●																									
			W																											
			WF																											
	Henslow's Sparrow *Ammodramus henslowii*	Dense herbaceous vegetation, moist ground litter, perches	B			●							●																	
			BF			●							●																	
			W																											
			WF																											
	Fox Sparrow *Passerella iliaca*		B																											
			BF																											
			W				●																							
			WF				●																							
	Song Sparrow *Melospiza melodia*		B		●											●						●								
			BF		●											●						●								
			W		●																									
			WF		●																									
	Lincoln's Sparrow *Melospiza lincolnii*	Brushy thickets 4 to 8 feet high with grass or sedge openings	B														●													
			BF														●													
			W																											
			WF																											
	Swamp Sparrow *Melospiza georgiana*		B													●														
			BF													●														
			W																											
			WF																											
	White-throated Sparrow *Zonotrichia albicollis*		B								●																			
			BF								●																			
			W				●																							
			WF				●																							

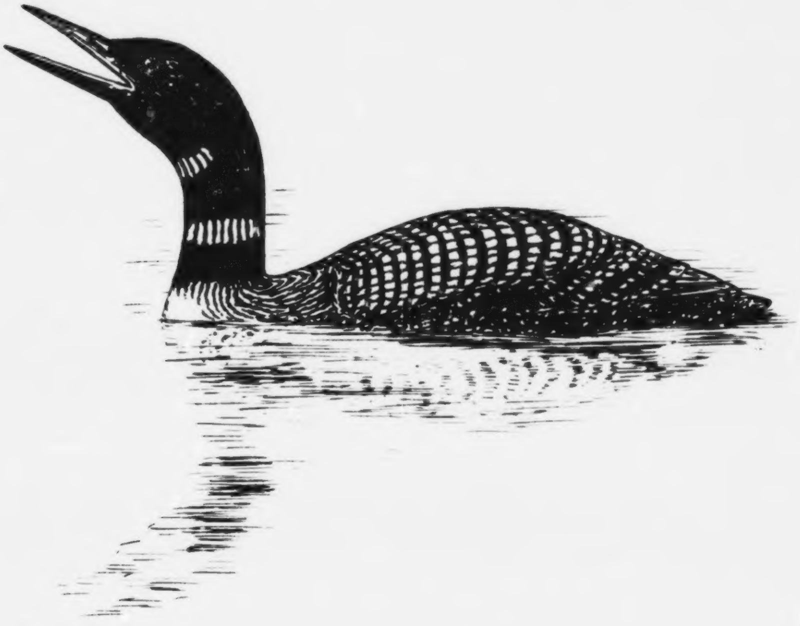
Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary salt marsh	Coastal beach rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Dark-eyed Junco *Junco hyemalis*		B								●																			
			BF								●																			
			W																											
			WF																											
	Lapland Longspur *Calcarius lapponicus*		B																											
			BF	●																										
			W	●																										
			WF																											
	Snow Bunting *Plectrophenax nivalis*		B																											
			BF																											
			W	●																										
			WF	●																										
	Bobolink *Dolichonyx oryzivorus*	Wide expanses of grassland	B		●																									
			BF		●																									
			W																											
			WF																											
	Red-winged Blackbird *Agelaius phoeniceus*		B											●																
			BF											●																
			W																											
			WF	●																										
	Eastern Meadowlark *Sturnella magna*	Grasslands, elevated perches	B		●																									
			BF		●																									
			W		●																									
			WF		●																									
	Rusty Blackbird *Euphagus carolinus*		B														●													
			BF														●													
			W																											
			WF																											
	Common Grackle *Quiscalus quiscula*		B													●														
			BF	●												●														
			W																											
			WF	●																										
	Brown-headed Cowbird *Molothrus ater*		B																											
			BF	●																										
			W																											
			WF	●																										
	Orchard Oriole *Icterus spurius*		B							●																				
			BF							●																				
			W																											
			WF																											
	Northern Oriole *Icterus galbula*	Tall scattered deciduous (preferably elm) trees	B						●																					
			BF						●																					
			W																											
			WF																											

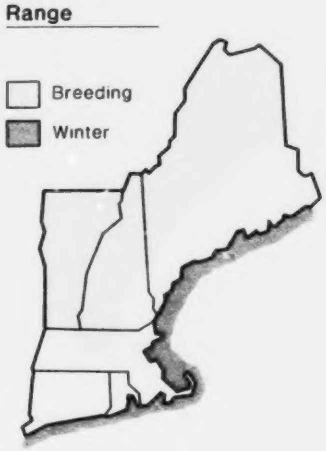
Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Pine Grosbeak *Pinicola enucleator*	Northern conifer forest.	B								●																			
			BF								●																			
			W																											
			WF																											
	Purple Finch *Carpodacus purpureus*	Coniferous trees.	B																											
			BF																											
			W																											
			WF																											
	House Finch *Carpodacus mexicanus*	Open ground with low seed-producing plants.	B																											
			BF																											
			W																											
			WF																											
	Red Crossbill *Loxia curvirostra*	Northern coniferous trees.	B																											
			BF																											
			W																											
			WF																											
	White-winged Crossbill *Loxia leucoptera*	Northern coniferous trees.	B																											
			BF																											
			W																											
			WF																											
	Common Redpoll *Carduelis flammea*		B																											
			BF																											
			W		●	●																								
			WF		●	●																								
	Hoary Redpoll *Carduelis hornemanni*		B																											
			BF																											
			W		●	●																								
			WF		●	●																								
	Pine Siskin *Carduelis pinus*	Conifers.	B																											
			BF																											
			W																											
			WF		●	●																								
	American Goldfinch *Carduelis tristis*	Open, weedy fields with scattered small trees.	B					●						●		●															
			BF					●						●		●															
			W																			●								
			WF																			●								
	Evening Grosbeak *Coccothraustes vespertinus*	Spruce and fir forest (breeding season).	B																											
			BF																											
			W																											
			WF																											
	House Sparrow *Passer domesticus*		B																											●
			BF	●																										
			W																											●
			WF	●																										

Common Loon

(Gavia immer)

A.O.U. No. 007.0





RANGE: Breeding: Alaska and n. Canada s. to c. Massachusetts, Montana, and California. Winter: Atlantic coast from Newfoundland to the Gulf of Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to locally common in breeding season Common along coast in winter. Subadults common along northeast coast in summer.

HABITAT: Breeding: Large and small freshwater lakes in both open and densely forested areas. Nest on lakes as small as 2 acres. Wintering: Coastal bays and inlets from Maritime Provinces south. Occasional on fresh water inland in southern New England until freeze-up.

SPECIAL HABITAT REQUIREMENTS: Bodies of water with stable water levels and little or no human disturbance. Long stretch of water for flight take-off. Islets for nesting; shallow coves for rearing of young (Hammond and Wood 1977).

NESTING: Egg dates: May 15 to July 16. Peak: June, New York (Bull 1974:51). Clutch size: 1 to 3, typically 2. Incubation period: 28 to 29 days. Nestling period: 1 day (precocial). Broods per year: 1. Age at sexual maturity: 2 or more years. Nest site: Nest is placed on ground at water's edge, usually on sand, rocks, or other firm substrate. Prefers small islands to shore but nests along protected bays, on promontories and small peninsulas. Islands provide better protection from mammalian predators than shore sites.

TERRITORY SIZE: 15 to 100 or more acres (6.1 to 40.5 ha) per pair in Minnesota (Olson and Marshall 1952), to 25 ha (62 acres) (Sjolander and Agren 1972).

HOME RANGE: Probably same as territory.

SAMPLE DENSITIES: Average 2 birds per square mile (0.8 birds/km^2) over a 60-square-mile (155-km^2) area in Minnesota (Olson and Marshall 1952) but highly variable depending on nest site availability.

FORAGING: Major foods: Fish (staple), amphibians, insects, aquatic plants, crustaceans, mollusks, leeches. Substrates: Water, pond and lake bottoms. Techniques: Swimming; diving in deep water; extending head and neck below surface, goose-like, in shallow water.

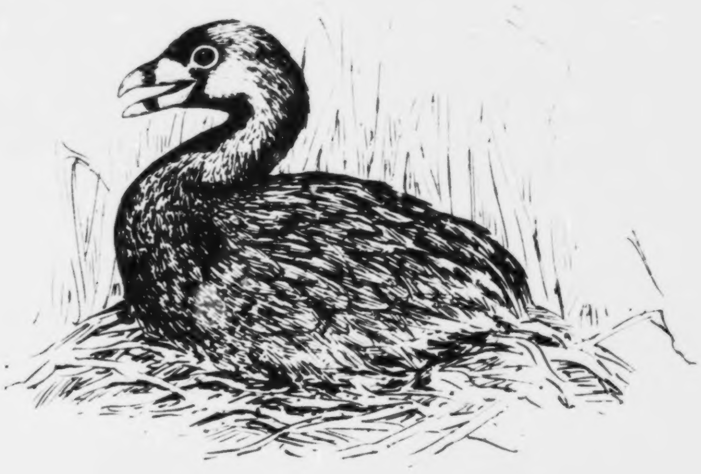
COMMENTS: Most feeding is done on the territory which probably accounts for the large territory. Although fish is eaten in quantity when available, it does not seem to be a required food because loons are known to breed at fishless ponds (Pough 1951:3). Same nest sites are often occupied year after year, presumably by same pair. Disturbance by canoeists and fishermen is a serious problem during nesting. Nesting is often unsuccessful if water level fluctuates.

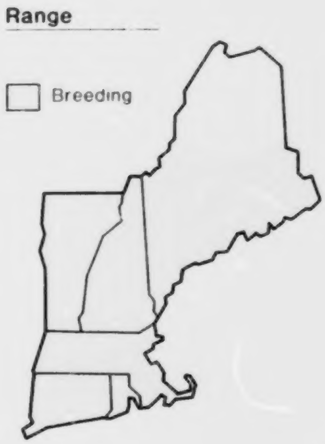
KEY REFERENCES: Bent 1919, Hammond and Wood 1977, Palmer 1962, Vermeer 1973.

Pied-billed Grebe

(Podilymbus podiceps)

A.O.U. No. 006.0





RANGE: Breeding: Throughout most of the United States (excluding Alaska) and s. Canadian provinces. Winter: New York s. along Atlantic coast; inland across coastal states. Occasional in winter in s. New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common throughout range in the Northeast during breeding season.

HABITAT: Breeding: Ponds with heavy emergent vegetation, marshes and marshy inlets with areas of open water (Faaborg 1976), sluggish streams with protective vegetation overhanging banks, reed-bordered swamps with open water. Wintering: Interior rivers and open lakes, tidal creeks and estuaries. Prefers fresh water.

SPECIAL HABITAT REQUIREMENTS: Birds need open water to become airborne, some aquatic vegetation (type not important) (Palmer 1962:108).

NESTING: Egg dates: April 21 to July 2, New York (Bull 1974:56). Clutch size: 2 to 10, typically 4 to 7. Incubation period: 23 to 24 days. Nestling period: 1 or 2 days (precocial). Broods per year: 1. Nest site: Usually built over shallow water anchored to the stems of emergent vegetation, less often located in shrubs such as sweet gale and buttonbush. A solitary nester but occasionally several nests are widely spaced at large ponds (Palmer 1962:108).

TERRITORY SIZE: Defends area within a 150-foot (45.7 m) radius (or more) of nest in Iowa potholes (Glover 1953).

HOME RANGE: About twice the size of nesting territory (Glover 1953).

SAMPLE DENSITIES: Generally 1 pair on ponds up to 10 acres (4 ha) (Palmer 1962:108). Nests may be spaced 15 to 30 feet (4.6 to 9.1 m) apart at larger ponds.

FORAGING: Major foods: Aquatic insects, small fish, snails, aquatic worms, crayfish, shrimp, amphibians, leeches. Minor feed: aquatic vegetation. Substrates: Water, bottoms of bodies of water. Techniques: Swimming, diving.

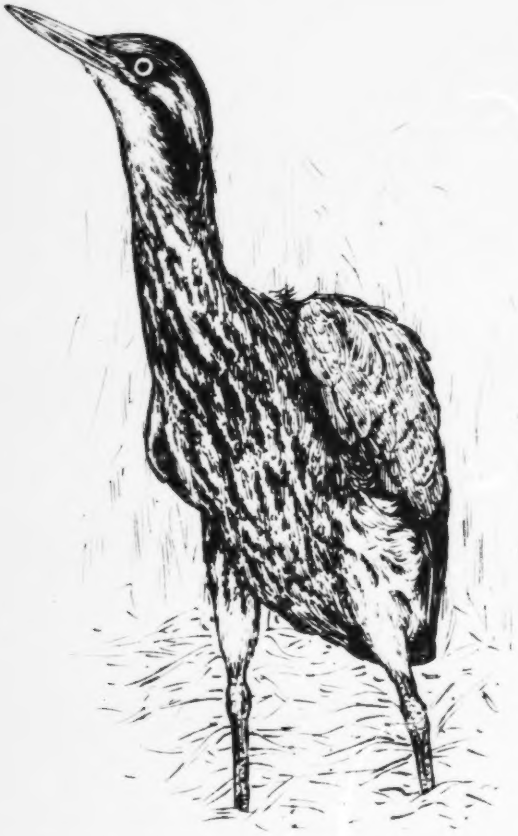
COMMENTS: Birds are solitary or seen in pairs or small groups (to 10 individuals) outside of breeding season.

KEY REFERENCES: Bent 1919, Chabreck 1963, Forbush 1929, Glover 1953, Palmer 1962.

American Bittern

(Botaurus lentiginosus)

A.O.U. No. 190.0



Range
Breeding

RANGE: Breeding: Newfoundland w. to British Columbia, s. to New Jersey, Arizona, and s. California. Winter: Coastal New York, w. to s. British Columbia, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common and widespread.

HABITAT: Breeding: Fresh (sometimes brackish and salt water) marshes, meadows, swamps and bogs, especially areas having tall vegetation such as cattails and bulrushes, sluggish rivers and streams with dense border vegetation. Wintering: Coastal wetlands.

SPECIAL HABITAT REQUIREMENTS: Tall marsh vegetation such as cattails and bulrushes in areas with little or no human disturbance.

NESTING: Egg dates: May 10 to June 29, New York (Bull 1974:90). Clutch size: 3 to 7, typically 4 to 5. Incubation period: About 24 days. Nestling period: About 14 days. Broods per year: Probably 1. Age at sexual maturity: Unknown (Palmer 1962:502). Nest site: Dry or wet ground near or in marshes, bogs, swamps. Usually well hidden in tall vegetation such as reeds, cattails, and so on, usually several inches above the water. Rarely in bushes or trees. Solitary nester.

SAMPLE DENSITIES: 5 nests on one slough less than 160 acres (64.8 ha) in Saskatchewan (Bent 1926:75). 2 nests on 5 acres (2.0 ha) of cordgrass meadow in Minnesota (Vesall 1940).

FORAGING: Major foods: Frogs (preferred), reptiles, crustaceans (crayfish, crabs), shellfish, insects, small fish, small mammals, spiders. Substrates: Water, shallow bottoms, aquatic vegetation. Techniques: Stand and wait, walk slowly (Kushlan 1976).

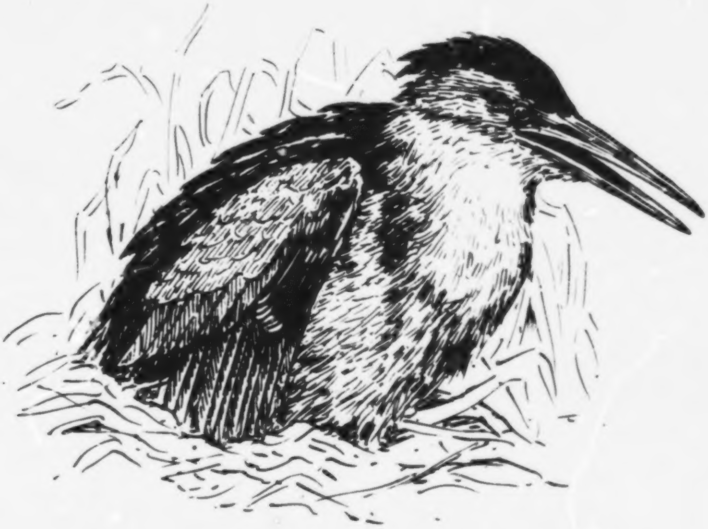
COMMENTS: So shy, bitterns are seldom seen. They are known to abandon a marsh at the slightest disturbance.

KEY REFERENCES: Bent 1926, Forbush 1929, Palmer 1962.

Least Bittern

(Ixobrychus exilis)

A.O.U. No. 191.0



Range
☐ Breeding

RANGE: Breeding: New Brunswick w. to Oregon, s. to South America. Winter: Georgia s. to Florida, w. to Texas and s. California, southward.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Fresh, brackish and, less frequently, salt water wetlands. Prefers marshes with tall vegetation such as cattails, sedges, and scattered bushes.

SPECIAL HABITAT REQUIREMENTS: Deep marshes with clumps of emergent vegetation.

NESTING: Egg dates: May 15 to July 10, New York (Bull 1974:91). Clutch size: 3 to 6, typically 4 to 5. Incubation period: 17 to 18 days. Nestling period: 10 to 14 days. Broods per year: 1 or 2. One in New England (Forbush 1929 V. 1:322). Age at sexual maturity: Unknown (Palmer 1962:496). Nest height: To 20 feet (6.1 m), typically 8 to 14 inches (20.3 to 35.6 cm) above water level. Nest site: Probably chosen by male. Usually located in dense stand of reeds, cattails, sedges or other marsh vegetation close to open water. The Least Bittern is usually a solitary nester.

TERRITORY SIZE: There is limited evidence of territoriality in Least Bitterns (Weller 1961).

SAMPLE DENSITIES: 15 nests were found in a 2-acre (0.8 ha) patch of rushes in Michigan (Wood 1951), but this was exceptional. 19 nests were found in a 44-acre (17.8 ha) marsh (Kent 1951 in Palmer 1962:496). 1 nest per 4 acres (1.6 ha) of useable vegetation (Beecher 1942).

FORAGING: Major foods: Small fishes, crustaceans (mainly crayfish), frogs and salamanders, reptiles, insects, occasionally shrews and mice. Substrates: Mud, marsh vegetation, shallow water. Techniques: Stand and wait, walk slowly (Kushlan 1976).

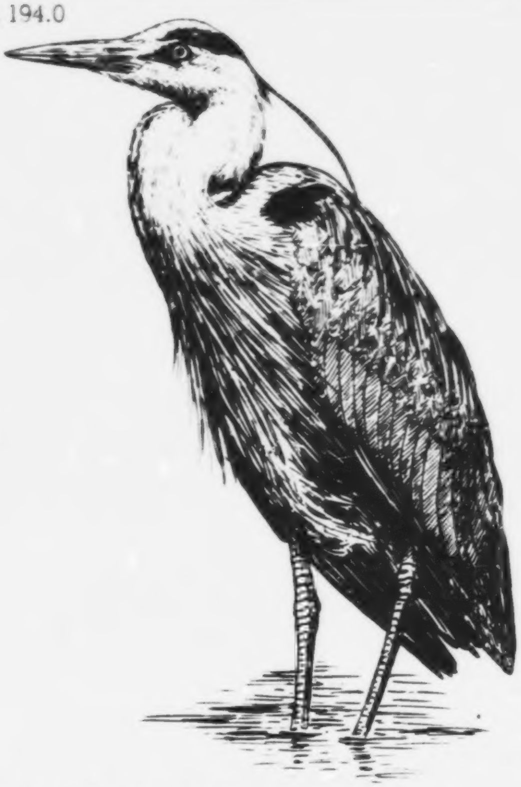
COMMENTS: Usually nests singly but may be colonial with other Least Bitterns in favorable habitat. Marsh drainage, pollution, and insecticides have adversely affected parts of its range.

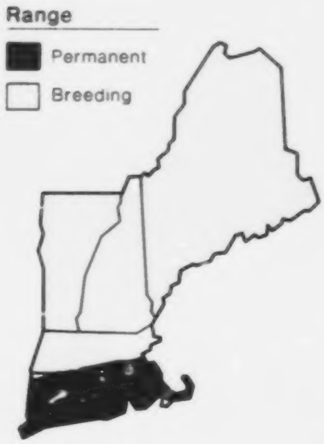
KEY REFERENCES: Bent 1926, Forbush 1929, Palmer 1962, Weller 1961.

Great Blue Heron

(Ardea herodias)

A.O.U. No. 194.0





RANGE: Breeding: Southern Canadian provinces, s. to s. Mexico. Winter: Massachusetts s. through coastal states, w. across the s. half of the United States, s. to n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common (Maine) to rare (Massachusetts) in breeding season.

HABITAT: Breeding: Shallow shores of ponds, lakes, streams, rivers, wet meadows, wooded swamps, fresh bays, and marshes. Wintering: Mainly coastal areas with bare (snow-free) ground and open water.

SPECIAL HABITAT REQUIREMENTS: Generally require tall tree for nesting.

NESTING: Egg dates: April 15 to June 9, New York (Bull 1974:73). Clutch size: 3 to 7, typically 4. Incubation period: About 28 days (Bent 1926:106). Nestling period: About 60 days (Pratt 1970). Broods per year: 1. Age at sexual maturity: 2 years (Bent 1926:108). Nest height: To 130 feet (39.6 m), typically high in large trees. Nest site: Varies with habitat. Usually in tall trees but may be built on ground, rock ledges, and sea cliffs, or in shrubs. Birds are typically colonial nesters but may be solitary. Same nest often repaired for use each season. Nest may be miles from food sources.

TERRITORY SIZE: Sizes vary with habitat and stage of reproductive cycle. Colonial nesters defend small areas often restricted to the distance the bird can extend its neck and bill from the nest.

SAMPLE DENSITIES: Dozens of nests may be built in crown of a single tree. 131 active nests per 0.36 ha (0.9 acre) in Oregon (Werschkul et al. 1976).

FORAGING: Major foods: Aquatic and terrestrial insects, fishes, amphibians, reptiles, crustaceans, occasionally small birds and mammals. Substrates: Shallow water, muddy bottoms, grasses and weeds. Techniques: Stand and wait (Kushlan 1976, Willard 1977), walk slowly. Active pursuit is infrequent. Occasionally floats (Pough 1951:40). Preferred feeding habitat: Wet meadows, pastures.

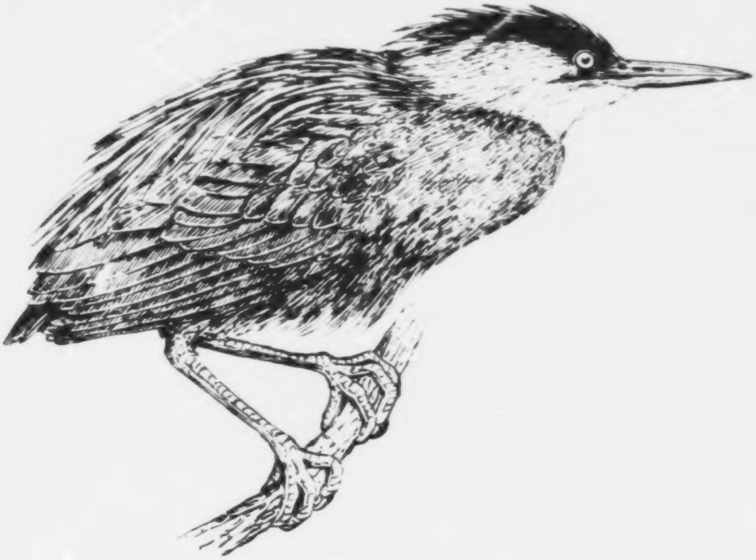
COMMENTS: Individual feeding territories may be strongly defended during the nonbreeding season. Birds occasionally nest miles from food source. Commonly seen feeding on tidal flats during migration.

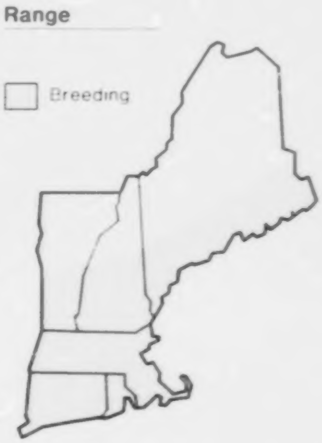
KEY REFERENCES: Bent 1926, Cottrille and Cottrille 1958, Palmer 1962, Pratt 1970.

Green-backed Heron

(Butorides striatus)

A.O.U. No. 201.0





RANGE: Breeding: Nova Scotia w. to Oregon, s. to Central America. Winter: South Carolina to Florida, w. along Gulf States, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to common and widespread.

HABITAT: Breeding: Widely distributed—makes use of nearly all fresh and salt water habitats: ponds, lakes, rivers, streams, sloughs, marshes, wooded swamps, wet meadows.

NESTING: Egg dates: April 29 to August 4, New York (Bull 1974:85). Clutch size: 3 to 6, typically 4 to 5. Incubation period: 19 to 21 days. Nestling period: 16 to 17 days. Fledge when about 21 days old. Broods per year: 1 (rarely 2). Age at sexual maturity: 1 year. Nest height: 1 to 30 feet (0.3 to 9.1 m), typically 10 to 15 feet (3 to 4.5 m). Nest site: Varies, often nests near water—on a hummock in a marsh or in a tree—but also may nest away from water in trees of dry woodlands and orchards. Often chooses conifers but uses many hardwood trees or shrubs. Sometimes uses old nest.

TERRITORY SIZE: Male defends a large area upon arrival but territory decreases to within a few feet of the nest as season progresses. Female helps defend.

SAMPLE DENSITIES: Green Herons are solitary or colonial, nesting in small groups of up to 30 pairs (Pough 1951:47). Larger groups are unusual, although 70 breeding pairs were found on an area 240 feet (73.2 m) by 1,500 feet (457.3 m) long on Long Island, New York (Palmer 1962:419).

FORAGING: Major foods: Small fishes, crustaceans, mollusks, terrestrial and aquatic insects, reptiles, amphibians, spiders, leeches. Substrates: Shallow water, shallow bottoms, wetland vegetation. Techniques: Stand and wait, walk slowly (Kushlan 1976).

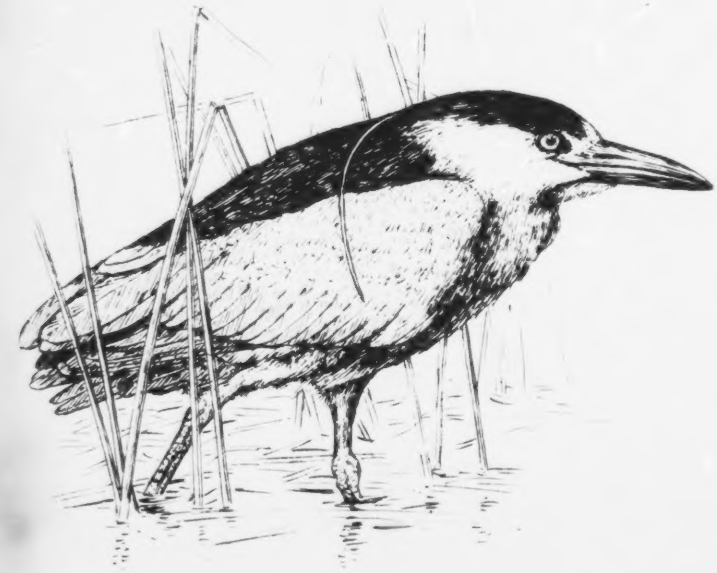
COMMENTS: Separate feeding territories are vigorously defended by some individuals. Occasionally many birds use a common feeding ground.

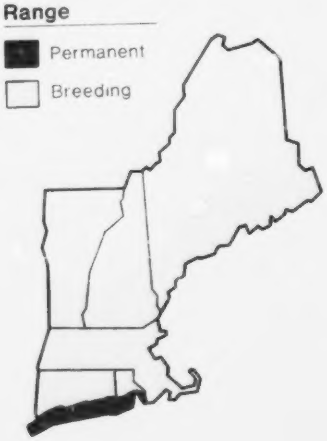
KEY REFERENCES: Bent 1926, Kushlan 1976, Palmer 1962.

Black-crowned Night-Heron

(Nycticorax nycticorax)

A.O.U. No. 202.0





RANGE: Breeding: Quebec w. to Oregon, s. to the Gulf of Mexico (excluding parts of Appalachian mountains) and South America. Winter: Southern New England w. to n. California, s. to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (coast) to rare (inland).

HABITAT: Breeding: Extremely varied Occupies fresh, brackish, and salt water areas. Formerly very common in the Northeast breeding in large colonies. Almost disappeared in the 1960's, presumably from pesticides, today the Black-crowned Night-Heron is found mainly along the coast. Wintering: Coastal wetlands and islands.

NESTING: Egg dates: April 1 to July 12, New York (Bull 1974:86). Clutch size: 2 to 6, typically 3 to 5. Incubation period: 24 to 26 days. Age at first flight: About 42 days. Broods per year: 1 (possibly 2). Age at sexual maturity: 2 to 3 years (occasionally 1 year, Gross 1923). Nest height: To 160 feet (48.8 m) (Oregon), typically 20 to 30 feet (6.1 to 9.1 m). Nest site: Varies from wooded areas and groves of pitch pine, spruce, red maple, and red oak to swamps of alder and cedar and cattail marshes (prairies), known to breed in city parks. Occasionally constructs floating nest but most often builds in shrubs or trees.

TERRITORY SIZE: Unknown. Birds defend area immediately surrounding nest. Communal feeding areas reported on Long Island. Some birds defend feeding territories and roosting sites (Palmer 1962:478, 479).

SAMPLE DENSITIES: 400 pairs on Pea Patch Island in the Delaware River in 1976 (Buckley et al. 1976).

FORAGING: Major foods: Fishes, crustaceans, mollusks, worms, aquatic terrestrial insects, reptiles and amphibians, occasionally young birds and mammals. Substrates: Shallow water, muddy and sandy bottoms, dry ground. Techniques: Stand and wait, walk slowly (Kushlan 1976).

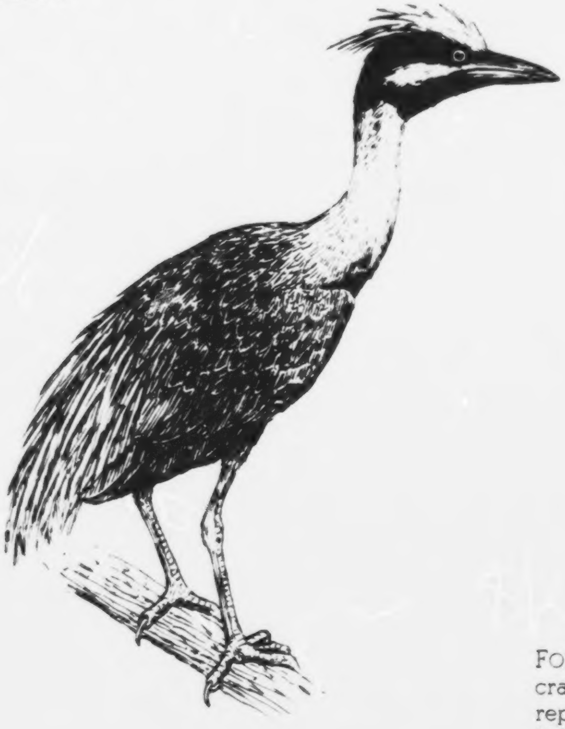
COMMENTS: Feeding activity is greatest at dawn and dusk with activity continuing into the early hours of darkness. Gregarious in all seasons.

KEY REFERENCES: Bent 1926, Forbush 1929, Gross 1923, Noble et al. 1938, Palmer 1962.

Yellow-crowned Night-Heron

(Nycticorax violaceus)

A.O.U. No. 203.0



Range
☐ Breeding

RANGE: Breeding: Eastern Massachusetts w. to Michigan (a few) and California s. to South America. May be extending breeding range in the Northeast—reports of sightings have increased in recent years. Winter: Central Florida w. to California, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common (coast) to rare inland.

HABITAT: Breeding: Islands in fresh and salt water, marshes, ponds, and wooded swamps where it nests in isolated groves of trees or bushes.

NESTING: Egg dates: April 30 to June 10, New York (Bull 1974:90). Clutch size: 3 to 6, typically 4 to 5. Incubation period: 24 days (Forbush 1929:342). Broods per year: Probably 1. Age at sexual maturity: Unknown (Palmer 1962:488). Nest height: To 50 feet (15.2 m). Nest site: Builds nest in isolated grove of trees or in brushy tangle at edge of pond, marsh, swamp. Rarely nests on the ground. Usually nests in small groups of 2 to 6 pairs at the edge of large heronries. Sometimes uses old nests.

TERRITORY SIZE: Sizes not known; birds defend an area for display, copulation, and nesting.

SAMPLE DENSITIES: 40 pairs on Pea Patch Island in Delaware River in 1976 (Buckley et al. 1976).

FORAGING: Major foods: Mainly crustaceans, especially crabs and crayfish, mollusks. Sometimes takes leeches, reptiles, amphibians, small birds and mammals, insects, fishes. Substrates: Shallow water, shallow bottoms. Techniques: Stand and wait; walk slowly (Kushlan 1976).

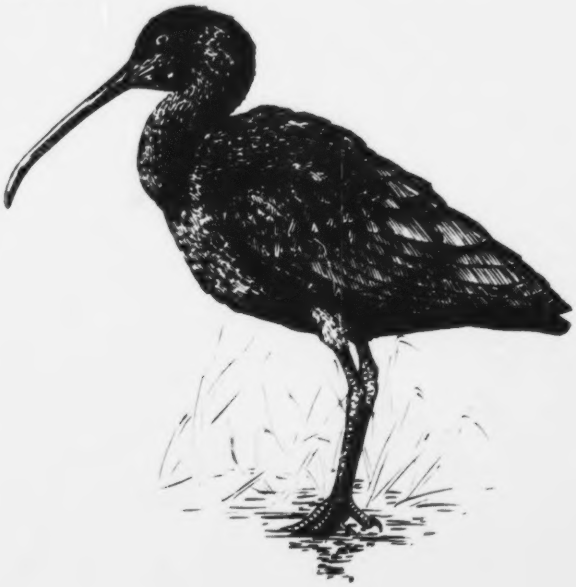
COMMENTS: Birds feed during the day and at night, singly or in twos or threes.

KEY REFERENCES: Bent 1926, Palmer 1962, Pough 1951.

Glossy Ibis

(Plegadis falcinellus)

A.O.U. No. 186.0



Range

RANGE: Breeding: Locally in Maine s. along the Atlantic coast to Florida. Winter: Florida and the Gulf States s. to Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Fresh, brackish, and salt water. On New Jersey coast, birds nest in mixed stands of holly, red cedar, sumac, salt myrtle, bayberry, wild cherry, grape and cat brier that grow on barrier beaches. Favor shallow pools bordered by shrubs and emergent vegetation.

NESTING: Egg dates: March to late May (Palmer 1962:521). Clutch size: 3 to 5, typically 3 to 4. Incubation period: 21 days. Nestling period: About 14 days. Broods per year: 1. Age at sexual maturity: Unknown (Palmer 1962:520). Nest height: To 10 feet (3.0 m). Nest site: On ground in tall, dense vegetation such as cattails and reeds, in low bushes or in tops of low trees growing in water. Birds are colonial nesters—associating with herons and other ibises.

SAMPLE DENSITIES: 600 pairs on Pea Patch Island in Delaware River in 1976 (Buckley et al. 1976).

FORAGING: Major foods: Crustaceans (especially crayfish), small snakes, cutworms and other grubs, grasshoppers, leeches. Substrates: Soft earth, shallow water, mud flats. Techniques: Probing. Preferred feeding habitat: Mud flats, flooded fields.

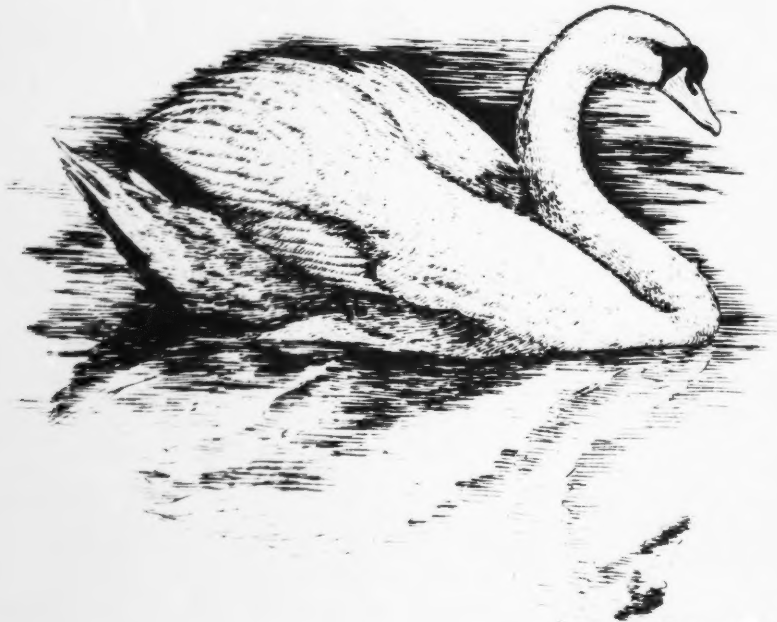
COMMENTS: The Glossy Ibis is extending its breeding range in the Northeast. It nested in Massachusetts in 1973 (new record) and over 100 pairs nested on coastal islands of the state in 1977 (Massachusetts Audubon Society 1977). Little is known about the birds' feeding habits in the Northeast.

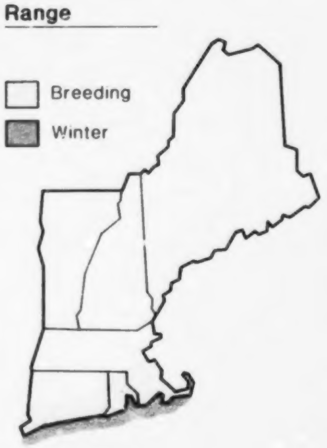
KEY REFERENCES: Bent 1926, Miller and Burger 1978, Palmer 1962, Williams 1975a.

Mute Swan

(Cygnus olor)

A.O.U. No. 178.2





RANGE: Breeding: Small colonies exist in the Eastern United States, mainly along the northeastern coastline with largest numbers occurring in the Long Island area. Smaller groups range locally from New Hampshire and Massachusetts to Virginia. Winter: Same as above.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common (coast) to rare inland.

HABITAT: Breeding: Coastal bays, marshes and ponds having dense aquatic vegetation. Wintering: Inland birds may be forced to move to brackish or salt water areas if fresh waters freeze. Otherwise, birds remain in breeding territories.

SPECIAL HABITAT REQUIREMENTS: Shallow waters with abundant aquatic vegetation.

NESTING: Egg dates: March 25 to June 15. Peak: May, Atlantic coast (Palmer 1976 V. 2:45). Clutch size: 2 to 11, typically 5 to 7. Incubation period: 35 to 36 days. Nestling period: 1 day (precocial). Broods per year: 1. Age at sexual maturity: 2 to 6. Nest site: Nest on the ground, preferably on small islands along secluded shores, in marshes, or at ponds. Favors shallow, clean, weed-filled waters. Sometimes colonial. Nest is typically placed in a clump of cattails surrounded by water.

TERRITORY SIZE: 4 to 10 acres (1.6 to 4.0 ha) in Michigan (Wood and Gelston 1972). 12 territories ranged from 0.5 to 11.8 acres (0.2 to 4.8 ha) in Rhode Island (Willey 1968 in Palmer 1976). When a pond is chosen for nesting, the male defends the entire pond against intruders (Palmer 1976 V. 2:44).

SAMPLE DENSITIES: Many scores of semi-domesticated pairs nested on 25 acres (10.1 ha) in England indicating that these birds will usually tolerate closer nesting (Bannerman 1958 in Palmer 1976 V. 2:44).

FORAGING: Major foods: Fish, crustaceans and aquatic insects (adults and larvae). Substrates: Water, bottoms of shallow bodies of water. Techniques: Immersing head and neck, up-ending in dabbling-duck fashion. Preferred feeding habitat: Areas with abundant submerged vegetation.

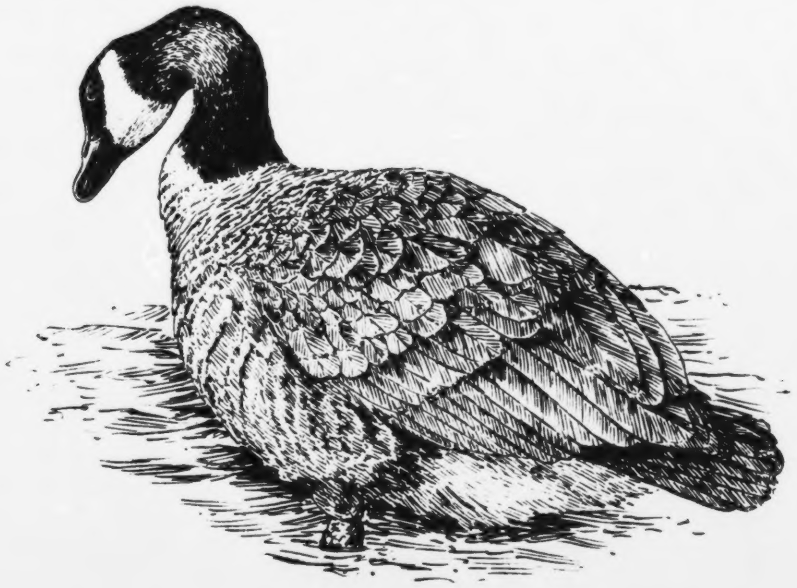
COMMENTS: Pair bond—life-long monogamy. Diet consists of nearly 100 percent vegetable material. Willey (1968 in Palmer 1976 V. 2:46) found by experiment that a swan consumed 8.4 pounds of wet vegetation per day over a 7-day period.

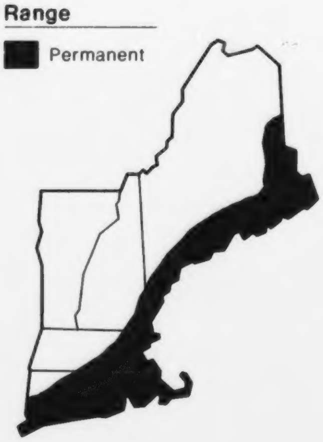
KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Palmer 1976 V. 2.

Canada Goose

(Branta canadensis)

A.O.U. No. 172.0





RANGE: Breeding: Coastal regions from Labrador to North Carolina. Scattered populations in inland refuges. Winter: Coast of Newfoundland s. to n. Mexico. Probably as much as 75 percent of the population winters from New Jersey to North Carolina (Palmer 1976 V. 2:192).

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Massachusetts) to uncommon (Maine) in breeding season. Common (Maine) in winter.

HABITAT: Breeding: Coastal salt marshes, shores of ponds and lakes, grassy fields. Wintering: Ice-free lakes, rivers, ponds, and coastal marshes that provide resting and feeding sites and agricultural lands that provide additional grazing areas.

SPECIAL HABITAT REQUIREMENTS: Shallow water, abundant plant foods.

NESTING: Egg dates: March 28 to May 14, New York (Bull 1974:99). Clutch size: 4 to 10, typically 5 or 6. Incubation period: 28 days. Nestling period: 1 day (precocial). Age at first flight: More than 50 days. Broods per year: 1. Age at sexual maturity: 2 or 3 years. Nest site: Typically near water in a grass-lined depression on ground. Occasionally in tree on abandoned nest of Osprey.

TERRITORY SIZE: Varies considerably. Size seems to be influenced by aggressiveness of defending male, type of habitat, amount of protective cover and density of breeding population (Bellrose 1976:159).

SAMPLE DENSITIES: Breeding densities vary greatly and seem to be influenced by availability of suitable nest sites rather than by territorial behavior (Johnsgard 1975:142).

FORAGING: Major foods: Tender shoots of grasses, sedges and other marsh plants, submerged vegetation, cultivated grains, and wild seeds and fruits. Substrates: Wet and dry ground water. Techniques: Ground gleaning, grazing, immersing head and neck. Preferred feeding habitat: Mud flats, grain fields, salt marshes, shallow waters of bays.

COMMENTS: Pair bond—life-long monogamy. Diet consists almost entirely of vegetable material.

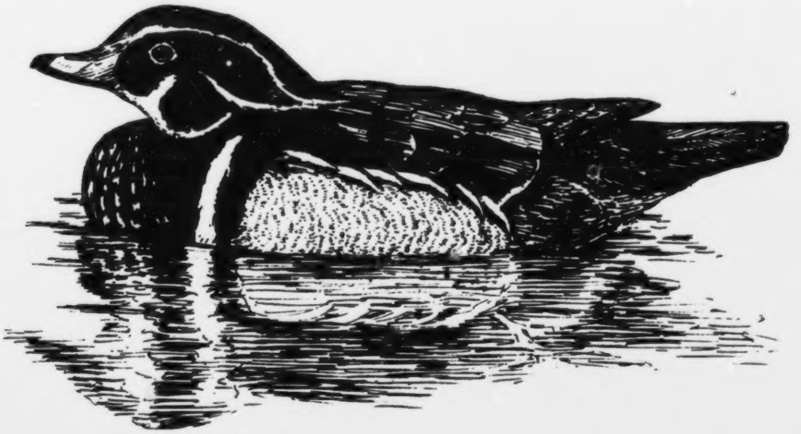
KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Palmer 1976 V. 2.

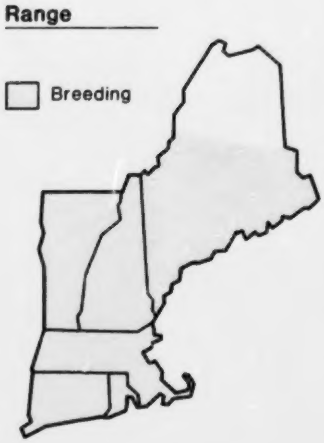
BEST COPY AVAILABLE

Wood Duck

(Aix sponsa)

A.O.U. No. 144.0





RANGE: Breeding: Northern Nova Scotia, s. to the s. tip of Florida, w. to the midwestern states. Winter: Maryland s. to Florida, w. to e. Texas.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon in breeding season, rare in winter.

HABITAT: Breeding: Shallow waters of ponds, lakes, or marshes having abundant floating and emergent vegetation. Wooded swamps or open flooded lowland forests where food is available. Shuns salt water. Wintering: Few birds winter in New England.

SPECIAL HABITAT REQUIREMENTS: Trees at least 16 inches d.b.h. with large cavities for nesting (minimum entrance hole 4 inches in diameter) (Scott et al. 1977, McGilvrey 1968).

NESTING: Egg dates: March 28 to July 15, New York (Bull 1974:108). Clutch size: 6 to 15, typically 9 to 14. Incubation period: 28 to 37 days, average 30 days. Nestling period: 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 2 to 65 feet, (0.6 to 19.5 m). Typically 20 to 50 feet (6.1 to 15.2 m). Nest site: In cavity of living (occasionally dead) deciduous or coniferous tree, usually within several hundred yards of water. Prefers water with brushy overstory for concealment and stumps and fallen logs for perching. Accepts nest boxes but usually occupies natural cavities and those excavated by Pileated Woodpeckers.

TERRITORY SIZE: Wood Ducks apparently do not defend an area around the nest. Drakes prevent other males from approaching mates for a short period prior to nesting (Grice and Rogers 1965:20).

HOME RANGE: No size information. Range seems to be unstable with dimensions and boundaries changing during the nesting season (Bellrose 1976:186).

SAMPLE DENSITIES: 63 nests (next boxes) per 150 acres (60.7 ha) in open marsh in Massachusetts (Grice and Rogers 1965:20,. 1 nest per 12 acres (4.9 ha) (Bellrose et al. 1964).

FORAGING: Major foods: Aquatic and terrestrial insects, acorns (favorite food), hickory nuts, waste grains, seeds of aquatic plants, fleshy fruits. Substrates: Shallow water, forest floor, fields. Techniques: Grazing, immersing head and neck, up-ending. Preferred feeding habitat: Water less than 18 inches deep that is still or slow-flowing (Johnsgard 1975:173).

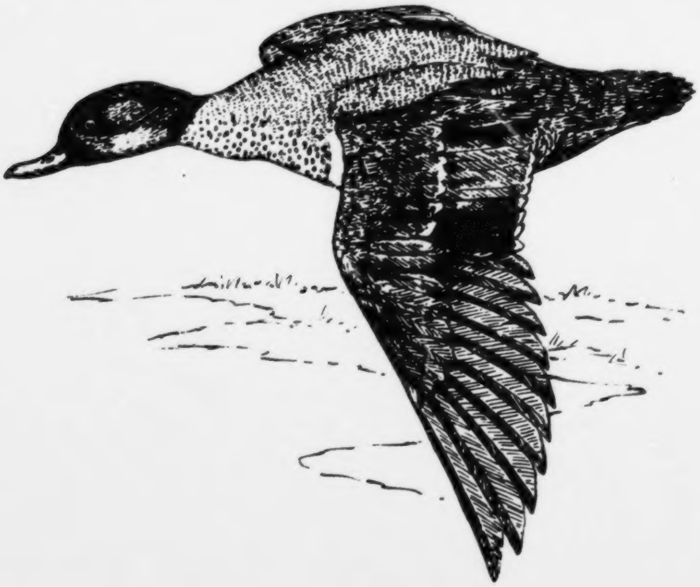
COMMENTS: Draining and clearing of lowlands destroy breeding and wintering Wood Duck habitat. Wood Ducks in Ontario find good breeding habitat in areas with beaver ponds and cavities made by Pileated Woodpeckers. Diets of Maine birds consisted of 95 percent vegetable and 5 percent animal material (Coulter 1957).

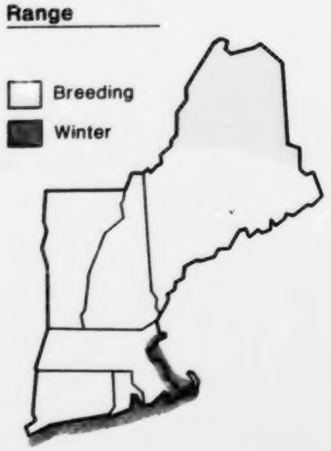
KEY REFERENCES: Bellrose 1976, Coulter 1957, Grice and Rogers 1965, Hester and Dermid 1973, Palmer 1976 V. 3.

Green-winged Teal

(Anas crecca)

A.O.U. No. 139.0





RANGE: Breeding: Labrador, w. to n. Alaska, s. to the mountains of n. New England, s. Colorado and California. Occasionally breeds at inland ponds in Massachusetts, New Jersey, Maryland, and Pennsylvania. Winter: Southern New England w. to s. Alaska, s. In the Atlantic flyway, most birds winter between New Jersey and Florida. Small numbers winter n. to s. Canada.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and local (Vermont) to common (Maine) breeder. Uncommon in winter.

HABITAT: Breeding: Ponds, lakes, sedge meadows, marshes near grasslands, dry hillsides with bushy thickets or adjacent open woodlands. Generally an upland nester. Wintering: Tidal creeks and ponds bordered by mud flats, estuaries, coastal brackish marshes. Avoids open salt water.

NESTING: Egg dates: May 25 to July 15, New York (Bull 1974:123). Clutch size: 5 to 16, typically 10 to 12. Incubation period: 21 to 23 days. Nestling period: Less than 1 day (precocial). Age at sexual maturity: 1 year. Broods per year: 1. Nest site: Prefers dense stands of grass, weeds, brush, 2 to 300 feet (0.6 to 91.4 m) from water (average 95 feet, 29 m) (Bellrose 1976:223). Nests are so well hidden they are difficult to find.

SAMPLE DENSITIES: 1 pair per 60 acres (24.3 ha) in grasslands in Alberta (Keith 1961). 20 pairs per square mile (8 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: Seeds (staple) of wetland plants especially millets, smartweed, and nutgrasses; insects, crustaceans, mollusks. Substrates: Shallow water, mud. Techniques: Dabbling, grazing, gleaning. Preferred feeding habitat: Prefers mudflats. Also forages in flooded or dry grain fields and woodlands.

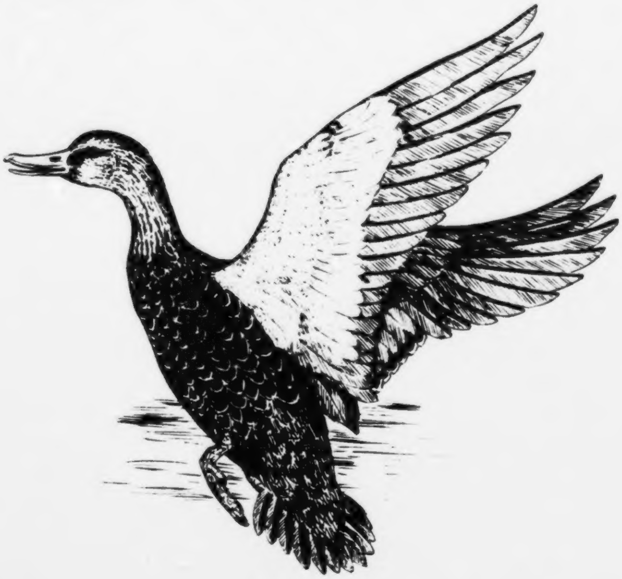
COMMENTS: Birds do not commonly nest in the Northeast. Occasionally they raise broods at inland ponds and marshes and along coast in the New Jersey-Long Island area. They are uncommon in winter but may appear in large groups locally. Occasionally they are seen in company of Eurasian Green-winged Teal *(A. c. crecca)*.

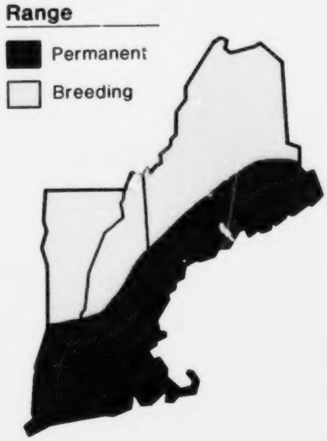
KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Palmer 1976 V.2.

American Black Duck

(Anas rubripes)

A.O.U. No. 133.0





RANGE: Breeding: Quebec and Labrador s. to Cape Hatteras, North Carolina. Greatest densities occur in coastal marshes. Winter: East coast—from Canadian border s. to Florida with about two-thirds remaining between Long Island and North Carolina. Inland—Lake Erie marshes and large river valleys.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant to uncommon.

HABITAT: Breeding: Marshy borders of ponds, lakes, rivers, and streams, wooded swamps, fresh, salt and brackish marshes and meadows. Wintering: Extensive open marshes of coast and interior. Blacks commonly return to same wintering areas year after year.

NESTING: Egg dates: April 2 to June 22, New York (Bull 1974:112). Clutch size: 6 to 11, typically 8 to 10. Incubation period: 26 to 28 days. Nestling period: Less than 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Usually on ground. Most nests are well hidden in vegetation (grasses, shrubs, briers, etc.) and are close to water. In uplands, nests may be a mile or more from water (Palmer 1976 V.2:329). Occasionally uses old crows and hawks nests, natural or excavated (pileated woodpecker) cavities in trees or tops of rotted stumps.

TERRITORY SIZE: 6 acres (2.4 ha) in Lake Erie marsh (Trautman 1947 in Palmer 1976 V. 2:338).

HOME RANGE: Up to 5 square miles (13 km^2) in New England (Coulter and Miller 1968).

SAMPLE DENSITIES: 1 nest per 20 to 40 acres (8.1 to 16.2 ha) in bogs in Maine (Coulter and Miller 1968). 21.4 nests per acre (0.4 ha) on islands in Chesapeake Bay (Stotts 1957). 5 nests per acre (0.4 ha) on islands in Lake Champlain (Coulter and Miller 1968). 5.3 pairs per hundred acres (40 ha) of brackish marsh in Maryland (Stewart 1962).

FORAGING: Major foods: Mollusks (coastal staple), submerged aquatic plants, waste grains, acorns, seeds of marsh plants, crustaceans, earthworms, amphibians, fishes. Substrates: Shallow water, grain fields. Techniques: Dabbling, grazing, gleaning.

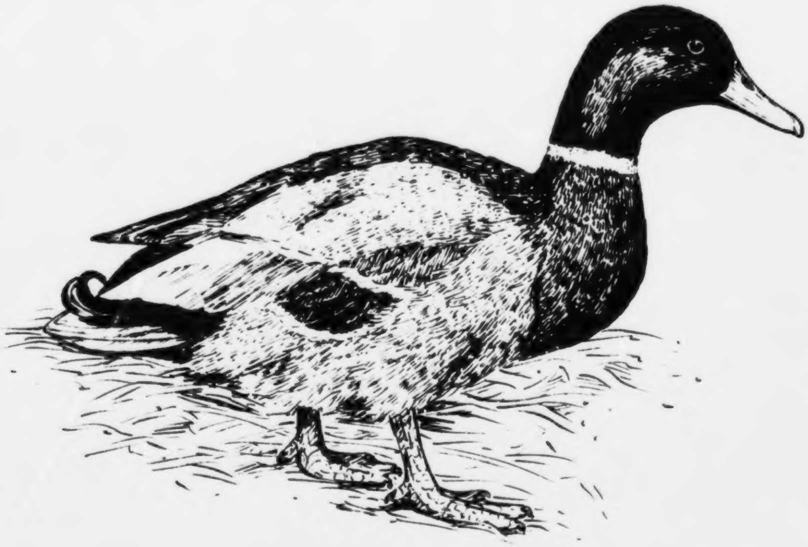
COMMENTS: Foods vary widely in different habitats. Plants comprise most of diet in fresh and brackish areas and animals are principal foods in marine environs. In late fall and winter, birds may leave their rest areas early in the day and just before sunset to travel to waste corn fields up to 25 miles (40 km) away (Bellrose 1976:261). Interbreeds with mallards—3 percent of blacks in the Atlantic flyway show plumage feathers of both species (Bellrose 1976:253).

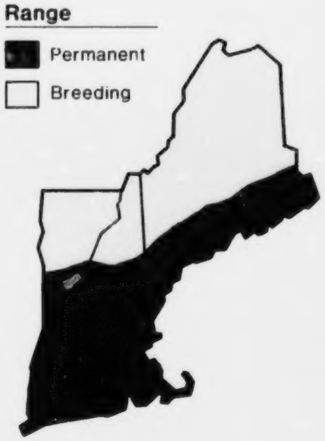
KEY REFERENCES: Bellrose 1976, Coulter and Miller 1968, Palmer 1962, Stotts 1957.

Mallard

(Anas platyrhynchos)

A.O.U. No. 132.0





RANGE: Breeding: Very broad breeding range covering the n. half of the United States, s. to n. Virginia in the East and Kansas and n. New Mexico in the West. Winter: Coast from Nova Scotia Inland from Maryland w. to c. Alaska and s. to s. Mexico. Feral stock in Massachusetts through winter.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common: (Massachusetts) to uncommon (Maine).

HABITAT: Breeding: Ponds, lakes, rivers, streams, marshes, wet meadows, wooded swamps. Prefers water less than 16 inches (41 cm) deep (Pough 1951:77). Avoids salt water. Wintering: Coastal marshes, inland ice-free ponds and rivers.

SPECIAL HABITAT REQUIREMENTS: Shallow water (less than 16 inches (41 cm) deep) that enables duck to bottom feed by tipping up (Pough 1951:77).

NESTING: Egg dates: March 25 to July 1, New York (Bull 1974:110). Clutch size: 6 to 15, typically 7 to 10. Incubation period: 26 to 30 days. Nestling period: Less than 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year (some individuals breed later). Nest site: Nest is usually located within 100 yards of water (Bellrose 1976:237) typically near water's edge in places where ground is dry or slightly marshy and vegetation is plentiful. Rarely nests in cavities, on hollowed tops of stubs or in tree crotches.

TERRITORY SIZE: About 2 square miles (5.2 km^2) at onset of breeding season (Palmer 1976 V.2:298). Territory coincides with home range early in breeding season and becomes progressively smaller as season advances. Drake probably defends mate rather than land area (Dzubin 1969 in Palmer 1976, V. 2:298).

HOME RANGE: About 2 square miles (5.2 km^2) at onset of breeding season (Palmer 1976 V.2:298). 700 acres (283.4 ha) in Manitoba (Dzubin 1955).

SAMPLE DENSITIES: 93 pairs per square mile (36 pairs/km^2) in Canadian Parklands (Dzubin 1969 in Palmer 1976, V. 2:300). 6.1 pairs per square mile (2 pairs/km^2) in prairie pothole habitat (Drewien and Springer 1969). 29 nests per 5.7-acre (2.3-ha) island in Lake Champlain (Coulter and Miller 1968).

FORAGING: Major foods: Seeds of sedges, grasses and smartweed are staples; also eats leaves, stems and seeds of other marsh plants, waste grain, snails, insects. Substrates: Shallow water, grain fields, meadows, bottoms of bodies of water. Techniques: Dabbling, grazing, gleaning.

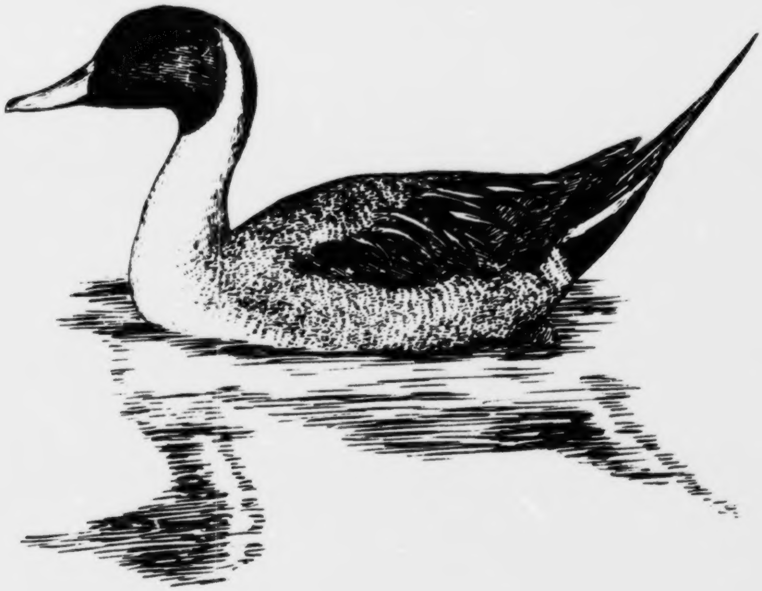
COMMENTS: About 40,000 Mallards winter between Massachusetts and Chesapeake Bay. Another 40,000 winter in the Chesapeake Bay itself (Bellrose 1976:235). It is presently the most abundant duck in North America but is not common throughout the Northeast.

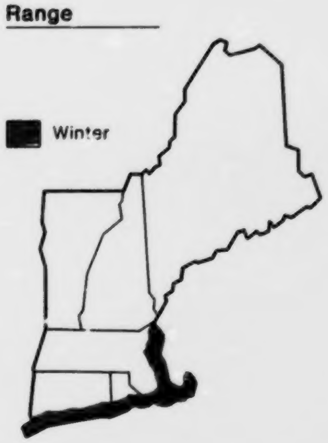
KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Palmer 1976 V. 2.

Northern Pintail

(Anas acuta)

A.O.U. No. 143.0





RANGE: Breeding: Hudson Bay w. to n. Mackenzie, s. to w. Iowa, n. New Mexico and s. California. Scattered breeding in Massachusetts (Monomoy). Winter: Atlantic coast—coastal Massachusetts and s. New England (occasionally) and mainly New Jersey s. to Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare breeder, locally common in winter.

HABITAT: Breeding: Shallow freshwater areas such as marshes, swamps and ponds generally in open country with low vegetation. Wintering: Fresh, brackish, and salt water marshes; large numbers occur in the Chesapeake Bay area and southward.

SPECIAL HABITAT REQUIREMENTS: Drakes need mudbanks or exposed water margins (Palmer 1976 V. 2:446).

NESTING: Egg dates: April to July (Bellrose 1976). Clutch size: 3 to 14, typically 7 to 9. Incubation period: 21 to 22 days. Nestling period: Less than 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Often in a hollow on dry ground; may or may not be concealed by grasses or shrubs, usually within 100 yards (average 40 yards) from water (Bellrose 1976:271).

TERRITORY SIZE: Pintails have shown little evidence of territoriality (Johnsgard 1975).

SAMPLE DENSITIES: 5.6 pairs per square mile (2 pairs per km^2) in South Dakota (Drewien and Springer 1969). About 12 pairs per 100 acres (40 ha) of water in Alberta (Keith 1961). 32 pairs per square mile (12 pairs per km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: The Pintail is chiefly a seedeater, preferring seeds of pondweeds, sedges, grasses, smartweeds and cultivated grains. Substrates: Shallow water, marsh vegetation. Techniques: Dabbling, gleaning, grazing. Preferred feeding habitat: Shallow waters of marshes, ponds, meadows, and grain fields.

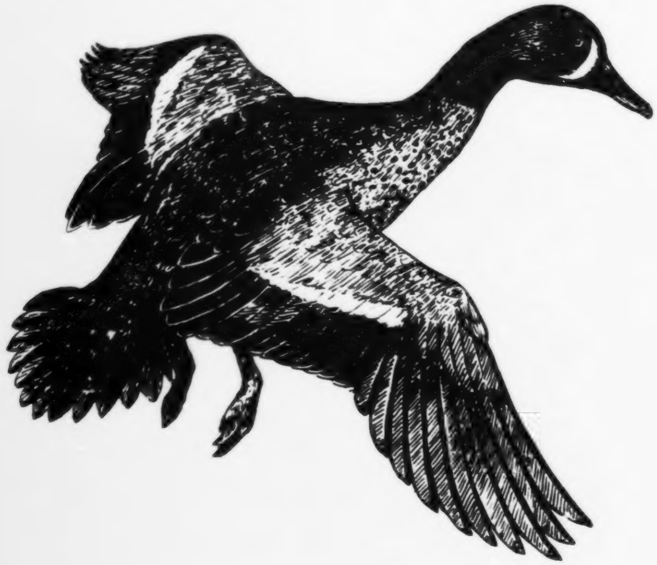
COMMENTS: On wintering grounds, Pintails feed in uplands on mast or grain or on tidal flats where they pick up marine animals (Pough 1951:82). Anderson (1959 in Palmer 1976 V. 2:458) found that the contents of 881 stomachs taken in Illinois consisted of 97 percent vegetable and 3 percent animal matter.

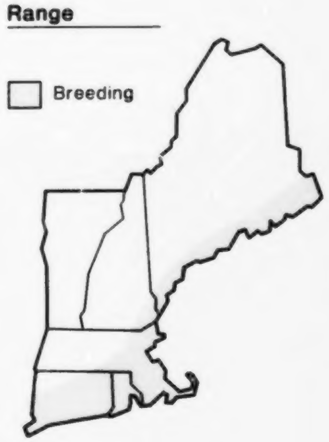
KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Munro 1944, Palmer 1976 V. 2.

Blue-winged Teal

(Anas discors)

A.O.U. No. 140.0





RANGE: Breeding: New Brunswick, s. to Tennessee and North Carolina, w. to s. Yukon and California. Winter: Southern Maryland, s. to Florida, w. to Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common in breeding season. Rare in winter.

HABITAT: Breeding: Fresh water coastal marshes, fresh meadows, rivers, ponds, and lakes. Prefers shorelines to open water and prefers calm water or sluggish currents to fast water. Rarely uses salt or brackish areas (pough 1951:86). In New York, birds favor large freshwater marshes and ponds with emergent vegetation (Bull 1974:126). Wintering: Shallow inland fresh water marshes, coastal brackish and salt water marshes.

NESTING: Egg dates: May 3 to July 4, New York (Bull 1974:126). Clutch size: 6 to 15, typically 8 to 11. Incubation period: About 24 days. Nestling period: Less than 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Prefers dense grassy sites, such as blue grass, hayfields, are sedge meadows, or ground under bushes within a mile of water's edge. Occasionally builds on a sedge tussock or muskrat house surrounded by water.

TERRITORY SIZE: Male appears to defend the female rather than an area of land (Johnsgard 1975:278, Bellrose 1976:281).

HOME RANGE: 250 acres (101.2 ha) in Manitoba (Dzubin 1955). 1.4 to 78.6 acres (0.6 to 31.8 ha) (average 17 acres (6.9 ha)) in Manitoba (McHenry 1971 in Bellrose 1976:281). 89 acres (36 ha) in South Dakota (Evans and Black 1956).

SAMPLE DENSITIES: 18 pairs per 100 acres (40, ha) on impoundments in Alberta (Keith 1961). 17.4 to 63.6 pairs per 100 acres (40, ha) on a variety of ponds in South Dakota (Drewien and Springer 1969). 4 to 22 pairs per 100 acres (40, ha) of wetland at 4 wetlands in Wisconsin (Jahn and Hunt 1964).

FORAGING: Major foods: Seeds of sedges, grasses, pondweeds, and smartweeds (staple foods); also eats leaves of aquatic plants, snails, crustaceans, and insects. Substrates: Water, mud, short grasses. Techniques: Dabbling, grazing, gleaning. Preferred feeding habitat: Mud flats, shallow water, fields.

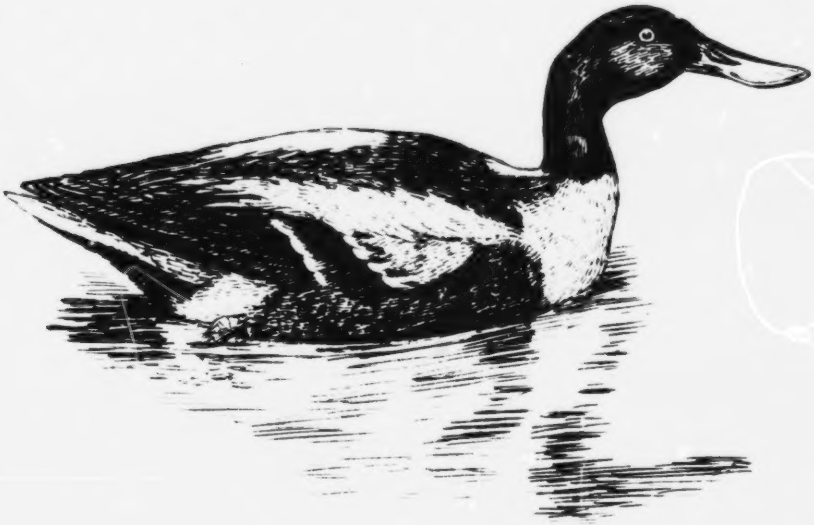
COMMENTS: Mabbott (1920 in Palmer 1976 V. 2:481) found that 70 percent of the diet is vegetable and 30 percent is animal. Blue-winged Teal are often seen feeding with green-winged Teal, but they have different food habits. Blue-winged Teal eat fewer seeds and more of the vegetative (leaves and stems) parts and more animal matter than do Green-winged Teal.

KEY REFERENCES: Bellrose 1976, Bennett 1938, Johnsgard 1975, Palmer 1976 V.2.

Northern Shoveler

(Anas clypeata)

A.O.U. No. 142.0



Range
☐ Breeding

RANGE: Breedings: Hudson Bay w. to w. Alaska, s. to n. Illinois, Oklahoma and s. California. Breeds very locally and irregularly in the Northeast, Lake Erie marshes in Ohio, Montezuma Marsh in New York. Winter: Long Island, New York w. to s. British Columbia, s. to Central America.

RELATIVE ABUNDANCE IN NEW-ENGLAND: Rare and local breeder, rare in winter.

HABITAT: Breeding: Sloughs, marshes, shallow ponds with open water and abundant aquatic vegetation. Apparently tolerates water pollution or stagnation. Wintering: Coastal bays and marshes, tidal flats.

SPECIAL HABITAT REQUIREMENTS: Shallow bodies of water with muddy bottoms, surrounded by dry grassy areas for nesting.

NESTING: Egg dates: Early April to early May, Delaware (Palmer 1976 V. 2:512). Clutch size: 8 to 13, typically 9 to 11. Incubation period: 22 to 24 days. Nestling period: Less than 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Prefers to nest in short grasses on dry ground. If unavailable, birds will use hayfields and meadows. Seldom nests in weedy patches and avoids woody vegetation such as willows. Nests are usually 75 to 200 feet (23 to 61 m) from waiting areas (Bellrose 1976:297). Shallow prairie marshes are preferred habitats (Johnsgard 1975:292).

TERRITORY SIZE: Males may defend mates rather than area of land (Hori 1963).

HOME RANGE: 8 home ranges ranged from 20 to 128 acres (8.1 to 51.8 ha) (average 76 acres, (30.8 ha)) (Poston 1969). 6 home ranges ranged from 15 to 90 acres (6.1 to 36.4 ha) average 49.7 acres (20.1 ha) (Poston 1969).

SAMPLE DENSITIES: 4.5 birds per square mile (2 pairs/km^2) in mixed prairie habitat (Bellrose 1976:293). 12.7 pairs per square mile (5 pairs/km^2) on a 3-square-mile (7.8 km^2) study area (Poston 1969). 44 pairs per square mile (17 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: Aquatic insects, snails, fish, crustaceans, seeds of aquatic plants, plankton. Substrates: Shallow water (surface and bottom), deep water (surface). Techniques: Immersing neck (rarely upending).

COMMENTS: Shovelers strain water through the lamellae of mandibles in order to separate and consume plankton.

KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Palmer 1976 V.2, Poston 1969.

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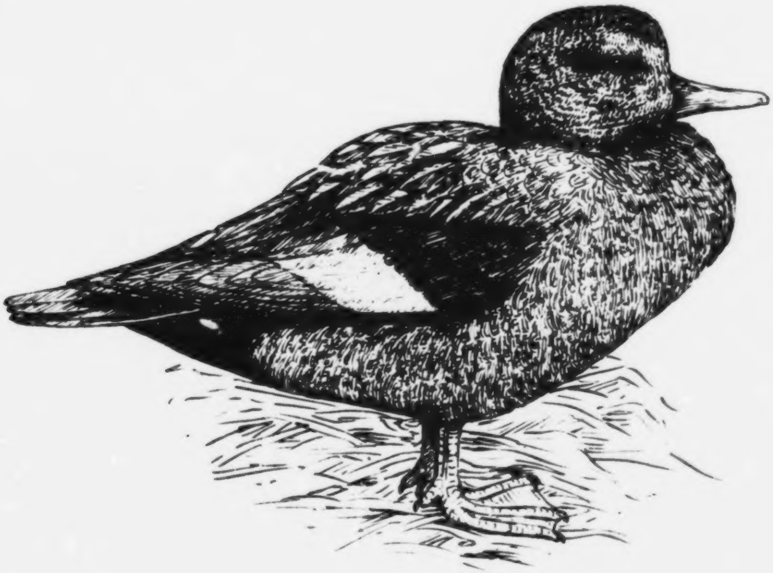
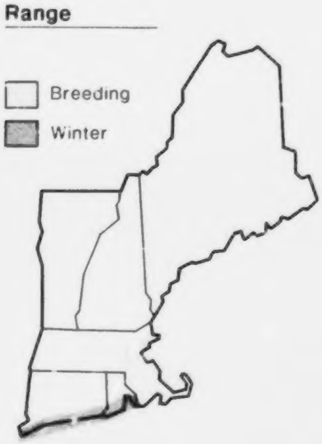
Gadwall

(Anas strepera)

A.O.U. No. 135.0





RANGE: Breeding: Main breeding range is in the West. Since 1939 gadwalls have been increasing in the East but breeding colonies are scattered. Lake Erie marshes in Ohio, Montezuma Marsh, New York, and a marsh near Concord, Massachusetts, are locations of a few eastern colonies. Winter: Coastal areas New York to Florida. Greatest numbers occur from Chesapeake Bay, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (Massachusetts) to rare (Maine).

HABITAT: Breeding: Mainly on fresh water impoundments created on the brackish marshes of coastal national wildlife refuges and state management areas. Also inland on shallow to deep, open-water marshes. Wintering: Coastal bays and marshes that remain free of ice; occasionally ice-free, wooded lakes.

SPECIAL HABITAT REQUIREMENTS: Moderate to large bodies of water. Submerged aquatic plants for food.

NESTING: Egg dates: May 30 to July 25, New York (Bull 1974:114). Clutch size: 5 to 13, typically 8 to 11. Incubation period: 24 to 27 days. Nestling period: 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year (late-hatched young may breed the second year). Nest site: Tends to be colonial nester. Prefers small islands and dikes in marshes, fields, and meadows usually within a few feet from water. Prefers uplands to nesting over water and uses dense vegetation (especially bulrush (Scirpus) and willow (Salix)) for cover (Williams and Marshall 1938).

HOME RANGE: Ranged from 34 to 87 acres (13.8 to 35.2 ha) (average 67 acres—27.1 ha) at Ogden Bay Marsh, Utah (Gates 1962).

SAMPLE DENSITIES: This is primarily a prairie pothole resident. Sample densities are: average 6.3 birds per square mile (2 pairs/km^2) in mixed prairies of North Dakota (Bellrose 1976:209). 200 nests per acre (0.4 ha) (island) Lower Souris National Wildlife Refuge, North Dakota (Henry 1948 in Palmer 1976 V. 2:394). 1 pair per 60 to 80 acrews (24.3 to 32.4 ha) in pothole areas of Dakotas (Palmer 1976 V. 2:394). New England densities are unknown, but would not approach these concentrations.

FORAGING: Major foods: Submerged aquatic plants (seeds or soft parts)—pondweeds, naiads, widgeon grass, eelgrass, filamentous algae, etc. Substrates: Shallow water. Techniques: Dabbling, diving.

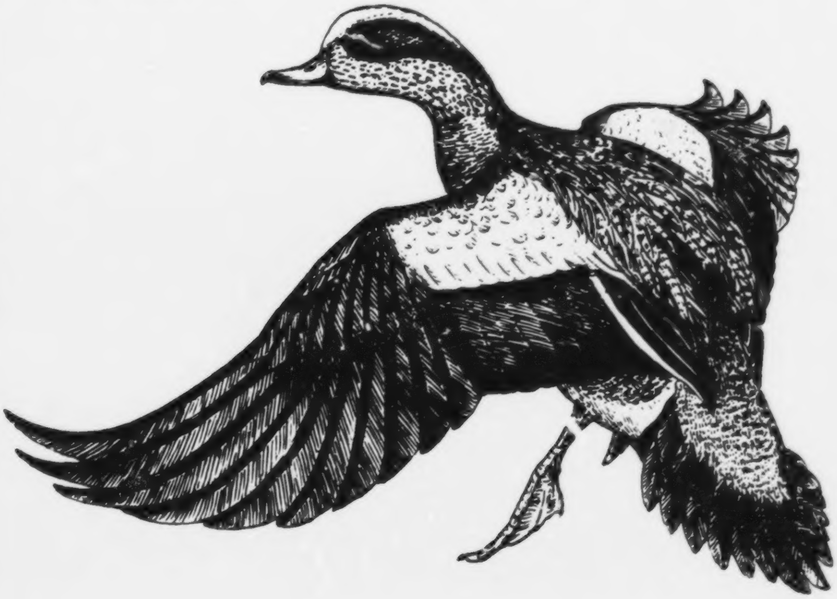
COMMENTS: Mabbott (1920 in Palmer 1976 V. 2:400) found that 98 percent of the contents of 362 stomachs was vegetable and 2 percent animal matter. Gadwalls prefer succulent stems to seeds. They rarely graze in pastures or grain fields.

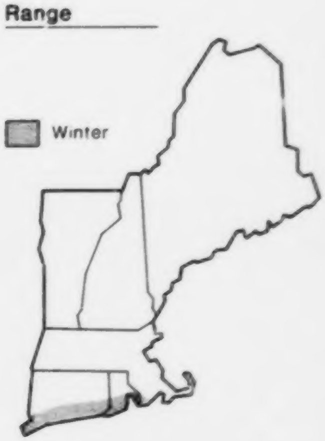
KEY REFERENCES: Bellrose 1976, Gates 1962, Palmer 1976 V. 2.

American Wigeon

(Anas americana)

A.O.U. No. 137.0





RANGE: Breeding: Hudson Bay, w. to Alaska, s. to w. Pennsylvania and Nebraska. Scattered breeding has occurred in New York, Delaware, Massachusetts, and w. Pennsylvania. Winter: Southern New England, Ohio Valley, se. Alaska, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and local breeder. Range is spreading eastward. Common along coast in winter.

HABITAT: Breeding: Isolated breeder. Perhaps large lakes or marshes with abundant open, shallow water and emergent vegetation especially sedges (*Carex* spp.) and rushes (*Juncus* spp.). Wintering: Shallow fresh and brackish ponds, wet meadows, coastal marshes, and bays.

NESTING: Clutch size: 3 to 11, typically 8 or 9. Incubation period: 22 to 24 days. Nestling period: Less than 1 day (Precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Nest may be close to water on an island or shore or as far as 400 yards (366 m) from water in open grassland or woodland. Usually on dry ground (Bellrose 1976:203).

SAMPLE DENSITIES: 16.6 birds per square mile (6 birds/km^2) at Mackenzie River Delta (Bellrose 1976:199). 9.4 birds per square mile (4 birds/km^2) at Yukon Flats in Alaska (Bellrose 1976:199). 7.4 birds per square mile (3 birds/km^2) in parklands (Bellrose 1976:199). 1.66 birds per square mile (0.6 birds/km^2) in closed boreal zone of Ontario (Bellrose 1976).

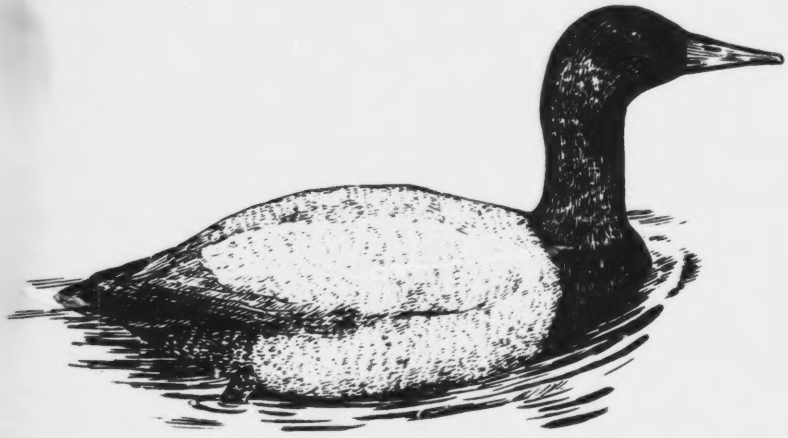
FORAGING: Major foods: Almost wholly vegetarian eating quantities of leaves, stems, and buds on pondweed, widgeon grass (staples), and wild celery, also eats tender shoots of grasses and occasionally snails. Substrates: Shallow water. Techniques: Dabbling, grazing, bottom and plant gleaning. Preferred feeding habitat: Large open water areas with abundant submerged plants.

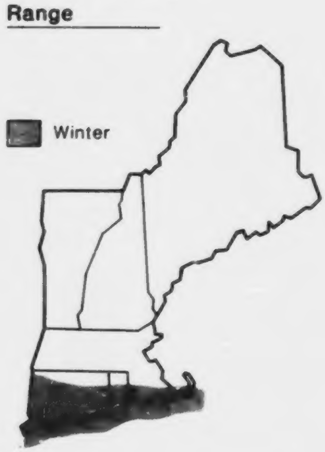
KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Munro 1949, Palmer 1976 V. 2.

Canvasback

(Aythya valisineria)

A.O.U. No. 147.0





RANGE: Breeding: Southern Wisconsin nw. to Mackenzie delta and c. Alaska, s. to New Mexico and Nebraska. Winter: Southern New England and e. New York, s. along the coast to Florida and w. through the Gulf States. Greatest numbers winter from New York to the Chesapeake Bay.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon and local in winter.

HABITAT: Wintering: Coastal areas, with greatest concentrations occurring in the Chesapeake Bay area. Prefers fresh and brackish estuarine bays with submerged plants, especially wild celery and eelgrass.

SPECIAL HABITAT REQUIREMENTS: Water areas with emergent vegetation. Stretches of open water for taking off and landing.

FORAGING: Major foods: Seeds and vegetative parts of aquatic plants, especially wild celery (*Vallisneria* spp.) and pondweeds (*Potomogeton* spp.), aquatic invertebrates. Substrates: Water. Techniques: Diving. Preferred feeding habitat: Large, permanent bodies of water.

COMMENTS: Winter surveys in the United States have shown a decline in Canvasbacks over the past 20 years.

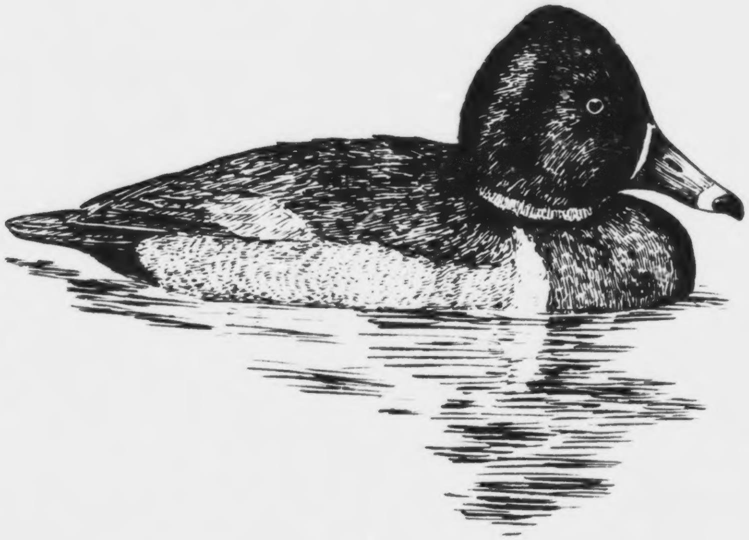
KEY REFERENCES: Bellrose 1976, Hochbaum 1944, Johnsgard 1975.

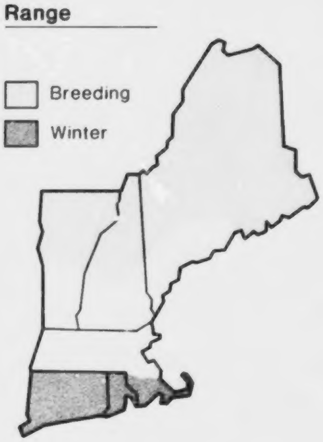
BEST COPY AVAILABLE

Ring-necked Duck

(Aythya collaris)

A.O.U. No. 150.0





RANGE: Breeding: Interior Newfoundland s. to n. New England and New York State (Adirondacks). Has nested in Massachusetts sporadically and rarely. Winter: Southern New England s. to Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to rare (Massachusetts).

HABITAT: Breeding: Flooded swamps, fresh water marshes, and bogs with abundant sedge, sloughs and beaver flowages near larger wooded lakes or rivers with submerged and emergent vegetation, often in heavily forested areas. Wintering: Fresh or brackish marshes and rivers. Seldom uses strictly saline water.

SPECIAL HABITAT REQUIREMENTS: Needs an expanse of open water to become airborne.

NESTING: Egg dates: Mid-May to early July. Peak: Mid-May (Maine) (Mendall 1958). Clutch size: 5 to 14, typically 9. Incubation period: 25 to 29 days. Nestling period: 1 day (precocial). Age at first flight: 49 to 56 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: In Maine, nests are typically on a floating mat of vegetation, but often in clumps of herbaceous or shrubby growth or on islands. Common cover plants are sedges, sweet gale, and leather leaf. Most nests are within a few feet of open areas with water (Bellrose 1976:332).

TERRITORY SIZE: Pairs space themselves but show little aggression. In Maine, Mendall (1958) observed ducks nesting as closely as 5 or 6 feet (1.5 to 1.8 m).

SAMPLE DENSITIES: 1 pair per 6 acres (2.4 ha) to 1 pair per 23 acres (9.3 ha) in various habitats (Mendall 1958:65). 6 nests were found on a 1/4-acre (0.1 ha) island in Maine (Mendall 1958). Average (6 years) 9 pairs per 100 acres (40 ha) in northern Wisconsin wetlands (Jahn and Hunt 1964).

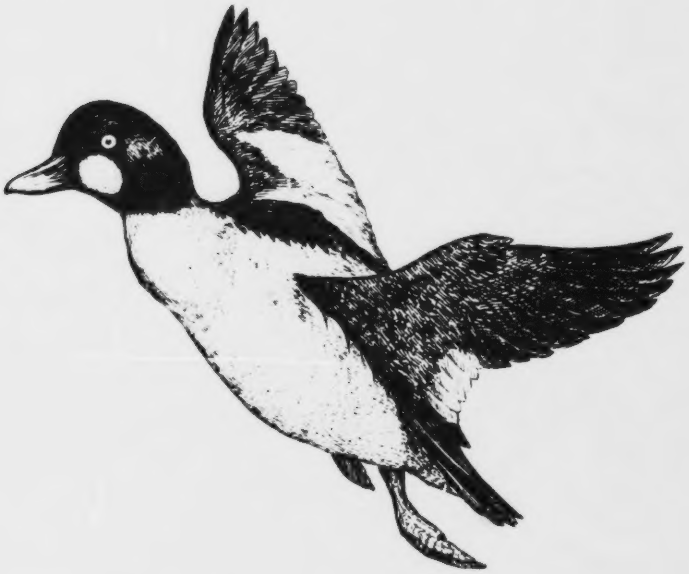
FORAGING: Major foods: Seeds and vegetative parts of submergent and emergent plants — 75 percent of diet; insects, mollusks, and so on — 25 percent of diet (Bellrose 1976:334). Substrates: Water, sandy and muddy bottoms. Techniques: Diving. Preferred feeding habitat: Shallow water, usually less than 6 feet deep (Bellrose 1976:334).

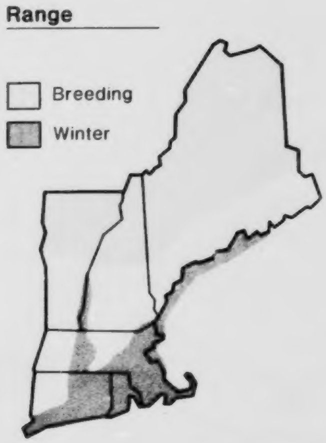
KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Mendall 1958, Palmer 1976 V. 3.

Common Goldeneye

(Bucephala clangula)

A.O.U. No. 151.0





RANGE: Breeding: Northern New England and New York, w. to n. Michigan and Minnesota and n. throughout much of Canada. Winter: Newfoundland to Florida. Most wintering birds are located on the coast between Long Island and North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon in the breeding season but common along coast in winter.

HABITAT: Breeding: Ponds, lakes, shallow rivers, floodplain forests and bogs, slowly flowing streams with weedy margins, usually near or in open wooded areas with large cavity-bearing trees. Wintering: Atlantic coast — on brackish or salt water estuarine bays. Inland — a few winter on large rivers.

SPECIAL HABITAT REQUIREMENTS: Large trees, minimum d.b.h. 20 inches (Thomas et al. 1979) with cavities for nesting and clear, cold, shallow water for feeding.

NESTING: Egg dates: April 7 to May 25, New Brunswick (Carter 1958). Clutch size: 5 to 15, typically 7 to 10. Incubation period: About 30 days. Nestling period: 1 to 2 days (precocial). Broods per year: 1. Age at sexual maturity: 2 years. Nest height: 6 to 60 feet (1.8 to 18.3 m), typically 20 feet (6.1 m). Nest sites: Cavities in trees in forested areas (often in silver maple or American elm in the Northeast). Open bucket-type cavities are commonly used and in New Brunswick proved better nest sites than enclosed cavities (Prince 1968). Also occupies cavity made by other species or uses natural cavities. Occasionally birds use terrestrial cavities among rocks. Accept nest boxes.

TERRITORY SIZE: No size information. The male defends a small area surrounding the nest site.

SAMPLE DENSITIES: Approximately 1 pair per 100 acres (40 ha) of hardwood swamp in New Brunswick (Carter 1958).

FORAGING: Major foods: Crustaceans; larvae of aquatic insects; mollusks; seeds, fruits, roots, and stems of aquatic plants. Substrates: Clear water, hard sandy bottoms. Techniques: Diving, drift-feeding (in currents), overturning stones on bottom with bill. Preferred feeding habitat: Shallow water 3 to 12 feet (0.9 to 3.7 m) deep (less than 5 feet (1.5 m) preferred).

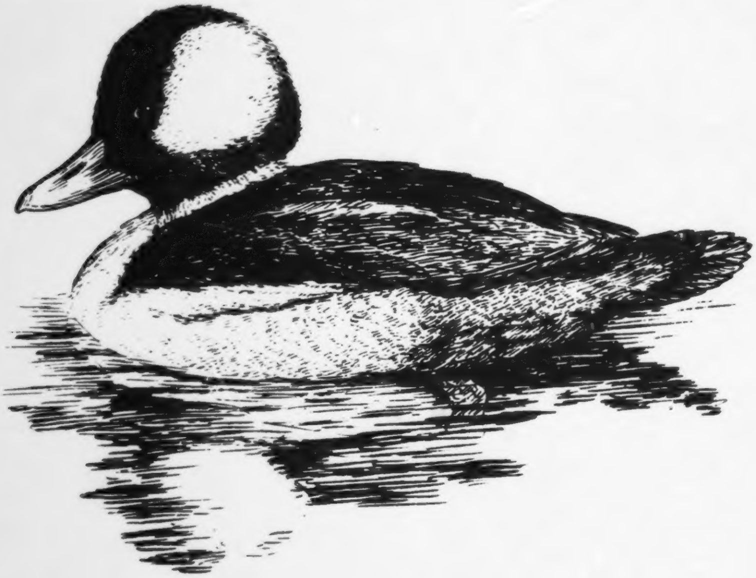
COMMENTS: 16 cavities in New Brunswick were located at an average height of 23 feet (7.0 m) above the ground in trees that averaged 26 inches (66 cm) in diameter. The trees were about 60 years old (Prince 1968). Cottam (1939 in Palmer 1976 V. 3:397) found that the contents of 395 stomachs contained 74 percent animal and 26 percent vegetable matter.

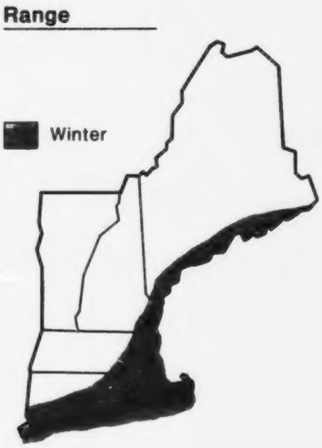
KEY REFERENCES: Bellrose 1976, Carter 1958, Palmer 1976 V. 3, Prince 1968.

Bufflehead

(Bucephala albeola)

A.O.U. No. 153.0





RANGE: Breeding: James Bay, w. and n. Winter: Atlantic Coast from s. Newfoundland to s. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in winter.

HABITAT: Wintering: Offshore and in sheltered salt and brackish waters of harbors and bays, interior impoundments and tributaries.

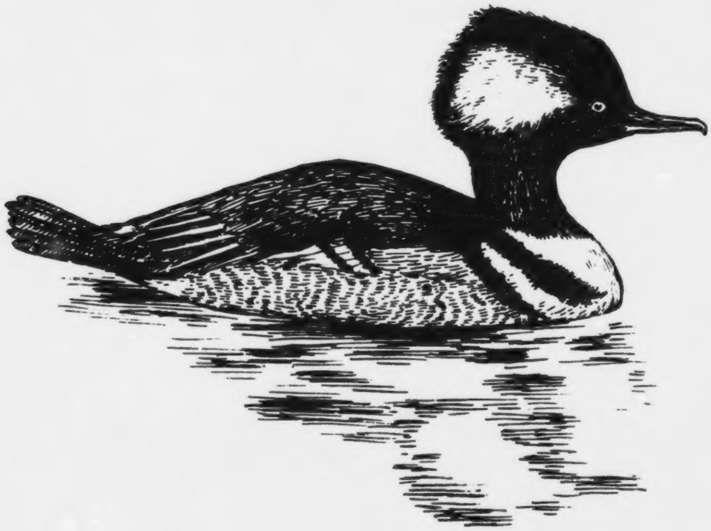
FORAGING: Major foods: Winter — crustaceans and mollusks (90 percent of diet), fish, seeds of pondweeds (Potomogeton), widgeon grass (Ruppia), and bulrush (Scirpus) (Erskine 1971). Substrates: Water. Techniques: Diving. Preferred feeding habitat: Shallow water 4 to 15 feet (1.2 to 4.6 m) deep over tidal flats and in large open bodies of water.

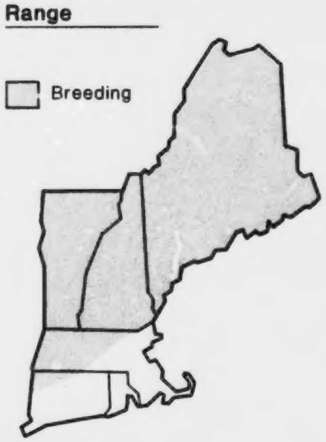
KEY REFERENCES: Bellrose 1976, Erskine 1971, Palmer 1976 V. 3.

Hooded Merganser

(Lophodytes cucullatus)

A.O.U. No. 131.0





RANGE: Breeding: Southern Nova Scotia s. to Florida, w. to the Great Plains and British Columbia. Winter: Nova Scotia (few) s. to Florida. Largest numbers winter s. of Connecticut. Also inland open water.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon and very local in breeding season.

HABITAT: Breeding: Heavily wooded ponds, lakes, rivers, streams, wooded swamps. Flooded shores with dead standing trees and stumps and wooded clear water streams are ideal habitat. Wintering: Ponds, fresh and brackish marshes, coastal brackish bays. Avoids salt water.

SPECIAL HABITAT REQUIREMENTS: Wooded areas with cavities for nesting. Clear fresh water containing small fish and invertebrates. Little or no human disturbance. Minimum diameter of suitable nest tree is 15 inches (38.1 cm) (Thomas et al. 1979).

NESTING: Egg dates: April 25 to July 2, New York (Bull 1974:152). Clutch size: 8 to 12, typically 10. Incubation period: 29 to 37 days. Nestling period: 1 day (Precocial). Broods per year: 1. Age at sexual maturity: Probably 2 years. Nest site: Normally nests in a natural tree cavity or old Pileated Woodpecker hole. The size, shape, and height of cavity seem to be unimportant (Bent 1923:23). Readily accepts nest boxes. Nest site is usually over water or close to the water's edge.

SAMPLE DENSITIES: Average 2.14 broods per mile (0.6 km) of river. Highest densities occurred on heavily wooded rivers — lowest densities were found on marshy rivers (Kitchen and Hunt 1969). Density may be related to availability of food rather than nest sites (Kitchen and Hunt 1969).

FORAGING: Major foods: Cottam and Uhler (1937 in Palmer 1976:459) found that the contents of 138 stomachs contained: fishes (44 percent), crayfish (22 percent), other crustaceans (10 percent), aquatic insects (13 percent), and vegetable matter (4 percent). Substrates: Water, muddy and stony bottoms. Technique: Diving. Preferred feeding habitat: Clear shallow water, usually less than 25 inches (63.5 cm) deep.

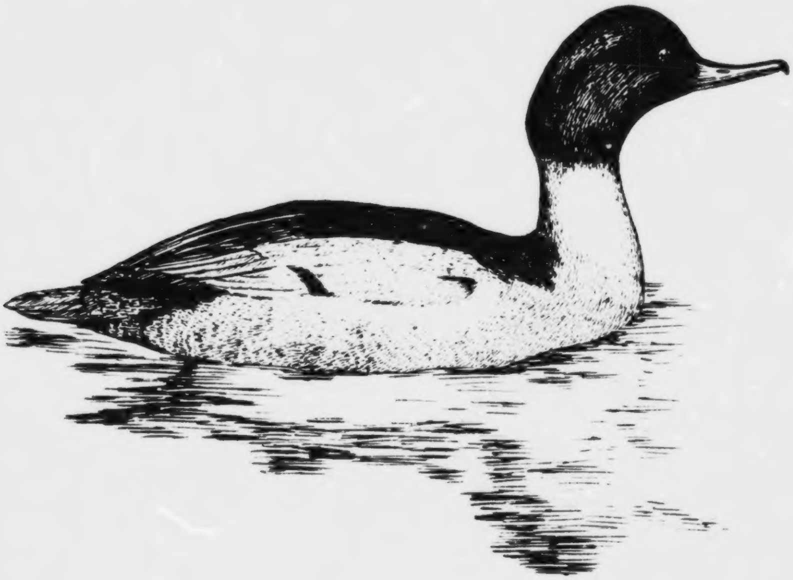
COMMENTS: The draining of wetlands, removal of snags, and pollution of water are human activities that have contributed to habitat loss.

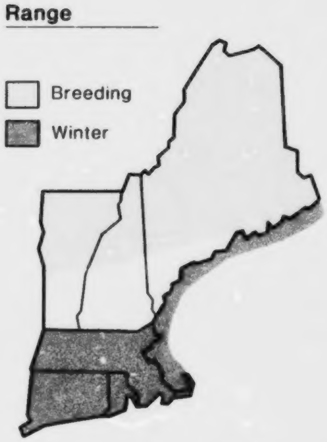
KEY REFERENCES: Bellrose 1976, Bent 1923, Johnsgard 1975, Palmer 1976 V. 3.

Common Merganser

(Mergus merganser)

A.O.U. No. 129.0





RANGE: Breeding: Northern Maine, n. New Hampshire, n. Vermont and n. New York w. to n. Michigan and Minnesota, into Canada. Occasionally s. to c. Massachusetts. Rarely to Catskill and Pocono Mountains. Winter: Maritime provinces s. to Virginia (few to Florida). Greatest concentrations occur in Lake Ontario and Niagara River regions of New York, and open inland water in New Hampshire.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Clear water ponds, lakes and rivers with forested shorelines. Wintering: Prefers fresh and brackish waters of rivers, lakes, ponds, and bays.

SPECIAL HABITAT REQUIREMENTS: Clear water for visibility while feeding. Large trees (minimum diameter 20 inches) with cavities for nesting (Thomas et al. 1979). Little or no human disturbance.

NESTING: Egg dates: May 5 to July 10, New York (Bull 1974:155). Clutch size: 6 to 17, typically 9 to 12. Incubation period: 32 to 35 days. Nestling period: 1 to 2 days (precocial). Broods per year: 1. Age at sexual maturity: Probably 2 years. Nest height: To 50 feet (15 m) or more. Nest site: Usually in a natural tree cavity or abandoned Pileated Woodpecker hole at any height. Sometimes on ground in holes in banks, on cliffs or piles of rocks. Ground nests are well hidden under low limbs, overhanging rocks or dense shrubs. Nests are usually placed close to water. Accepts nest boxes.

HOME RANGE: No size information. Pairs are generally widely spaced, probably because of feeding requirements.

SAMPLE DENSITIES: 1 or 2 pairs per 16 mile (25.6 km) stretch of river in Michigan (Parmalee 1954). 34 pairs per 2.3 square miles (34 pairs/6 km^2) on islands off Finnish coast (Hilden 1964).

FORAGING: Major foods: Fishes (staple), mollusks (winter). Substrates: Water, submerged terrain. Techniques: Diving, immersing head. Preferred feeding habitat: Calm to rapid flowing shallow water 1.5 to 6 feet (0.5 to 1.8 m) deep (Johnsgard 1975:514).

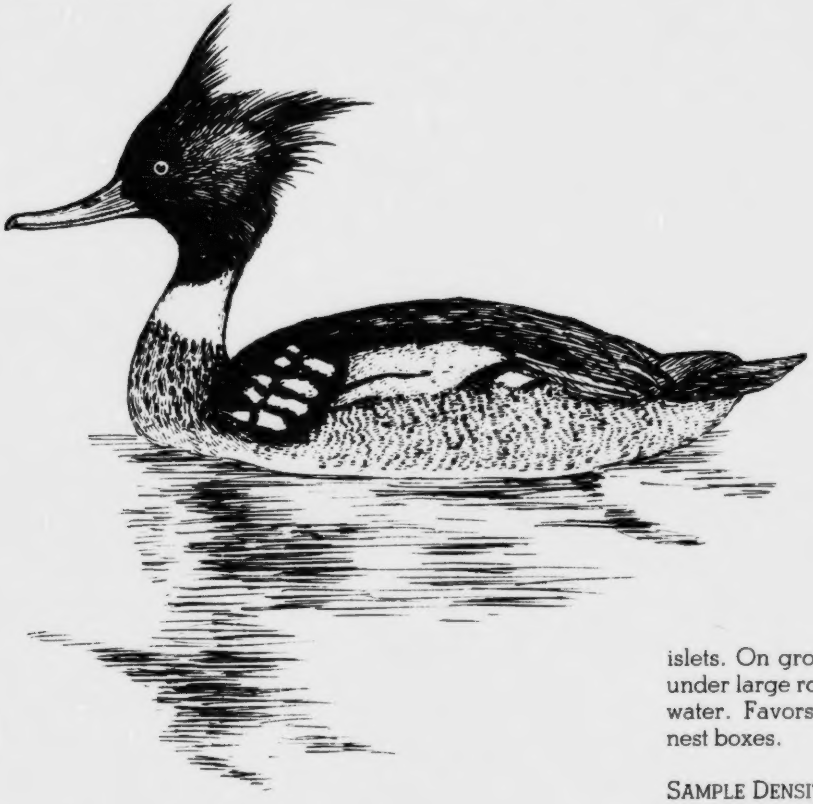
COMMENTS: Small groups have been known to cooperatively drive small fish into shallow water for easy capture (Johnsgard 1975:514).

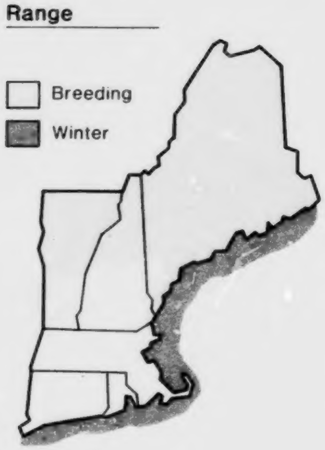
KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Palmer 1976 V. 3.

Red-breasted Merganser

(Mergus serrator)

A.O.U. No. 130.0





RANGE: Breeding: Northern Maine, New Hampshire, Vermont, and New York w. to n. Minnesota, n. into Canada. Atlantic coast s. to Massachusetts and Long Island (rarely) (Bull 1974:158). Winter: Atlantic coast from the Maritime Provinces s. to Florida. Greatest numbers in the Northeast occur in the Long Island area.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon in breeding season, common in winter.

HABITAT: Breeding: Rivers, streams, ponds, and lakes in forested areas and on coastal islands. Ideal habitat is a small island with low woody growth or low-hanging conifer limbs. Wintering: Mainly coastal waters, bays and inlets, but avoids deep or rough water. Less commonly on open inland waters.

SPECIAL HABITAT REQUIREMENTS: Clear water for visibility when feeding.

NESTING: Clutch size: 5 to 16, typically 8 to 10. Incubation period: 26 to 28 days. Nestling period: 1 day (precocial). Broods per year: 1. Age at sexual maturity: 2 years. Nest site: Highly variable from marshes to rocky, treeless islets. On ground under shrubs or in terrestrial cavity under large rocks or driftwood. Usually within 25 feet of water. Favors areas with scattered boulders. Accepts nest boxes.

SAMPLE DENSITIES: Birds are usually solitary, but at an ideal site 6 to 10 birds will nest closely. Greater densities have been found on islands than on mainland of Iceland (Bengtson 1970).

FORAGING: Major foods: Fishes (staple), crustaceans, aquatic insects, worms, fish eggs. Substrates: Water, submerged terrain. Techniques: Diving, immersing head. Preferred feeding habitat: Shallow, sandy shores just beyond breakers (coast), inlets and river mouths.

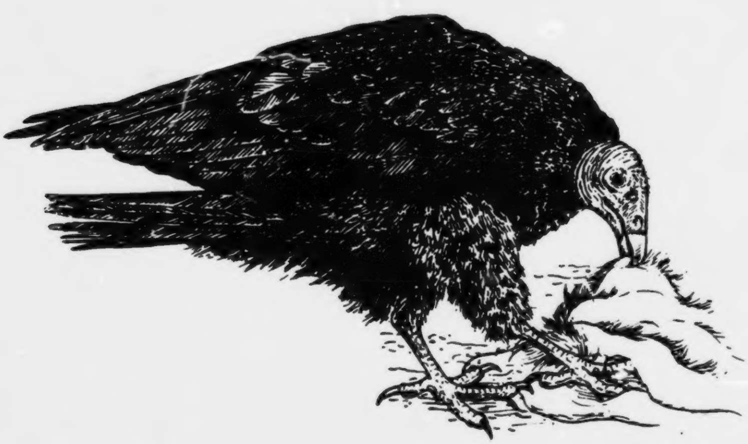
COMMENTS: Groups engage in cooperative feeding by driving schools of fish into shallow water where they can be caught more easily (Bellrose 1976:453).

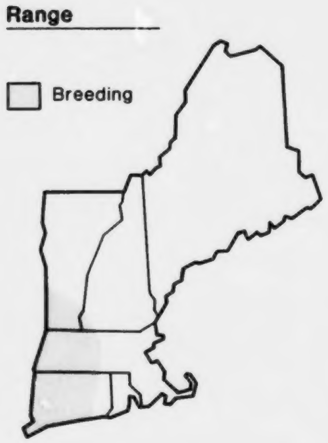
KEY REFERENCES: Bellrose 1976, Johnsgard 1975, Palmer 1976 V. 3.

Turkey Vulture

(Cathartes aura)

A.O.U. No. 325.0





RANGE: Breeding: Central New York, Connecticut and w. Massachusetts, w. to British Columbia, s. to South America. Winter: Maryland and New Jersey, w. to Ohio.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common, numbers increasing.

HABITAT: Breeding: Various habitats, including wet, dry, open, and wooded. Wooded habitat is dominated by deciduous or mixed trees. Wintering: Similar to breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Clearings such as fields and roads in which carrion can be easily sighted.

NESTING: Egg dates: May 4 to June 30, New York (Bull 1974:166). Clutch size: 1 to 3, typically 2. Incubation period: About 30 days. Nestling period: 70 to 84 days (Kempton 1927—2 broods). Broods per year: 1. Nest site: On rocky outcrops or ledges or in rocky caverns, in hollow tree trunks or logs in open deciduous woodlands. Eggs are usually well hidden from view and inaccessible to predators. Females show attachment to old nest sites.

SAMPLE DENSITIES: Probably fewer than 2 or 3 birds per square miles (1 bird/km^2) at southern part of range (Forbush and May 1939:95). 0.3 pairs per 100 acres (40 ha) in mixed habitat (forest-brush-farmland) in Maryland (Stewart and Robbins 1958:105).

FORAGING: Major foods: Carrion of amphibians, reptiles, birds, mammals, and fish; also eats small quantities of plant material. Substrates: So variable that no single substrate can be emphasized except perhaps roadways because of their many road kills. Technique: Soaring. Preferred feeding habitat: Open fields, ridges.

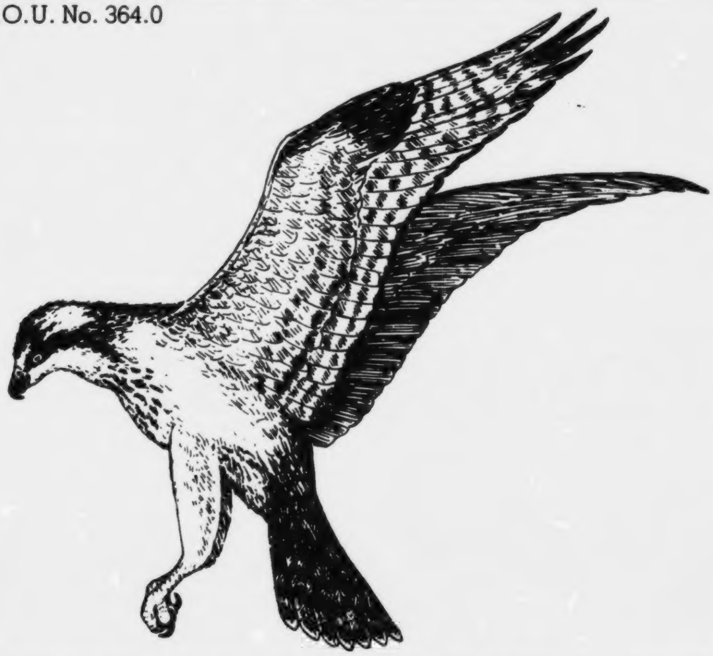
COMMENTS: The Turkey Vulture's recent range extension and population increase in the Northeast may be related to warmer climate, more deer, and more highways to cause road kills (Bull 1964:148). Birds frequent mountain ridges and valleys in search of food. They use tall snags for roosting and preening.

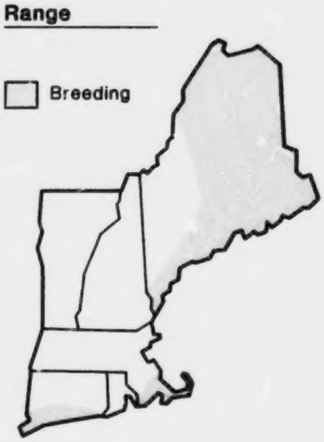
KEY REFERENCES: Bent 1937, Forbush and May 1939, Kempton 1927, Todd 1940, Work and Wool 1942.

Osprey

(Pandion haliaetus)

A.O.U. No. 364.0





RANGE: Breeding: Practically worldwide. In the Eastern United States, birds breed from Maine to Florida. Ospreys are scattered and uncommon except at traditional coastal breeding areas where scores may nest. Winter: Florida and the Gulf States, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common but generally uncommon to rare.

HABITAT: Breeding: Near large bodies of water that support abundant fish. Birds nest along rivers and lakes but greatest densities occur along the coast at estuaries.

SPECIAL HABITAT REQUIREMENTS: Clean water with adequate supply of fish. Elevated nest sites.

NESTING: Egg dates: April 27 to June 21, New York (Bull 1974:169). Clutch size: 2 to 5, typically 3. Incubation period: About 28 days. Age at first flight: 8 to 10 weeks. Broods per year: 1. Age at sexual maturity: 3 years. Nest height: To 130 feet (39.6 m). Nest site: A variety of places — tall dead trees are most often chosen. Other sites include rocky ledges, sand dunes, telephone pole crossarms, and artificial platforms. All are taller than surrounding land and provide good vantage points. Sometimes loosely colonial.

TERRITORY SIZE: Undetermined. A pair defends the immediate nest site from other Ospreys (Ogden 1975).

SAMPLE DENSITIES: Nests may be grouped as close as 65 feet (20 m) (Ogden 1975). Active nests in the Adirondacks (New York) ranged from 4.5 to 20 miles (7.2 to 32 km) apart (Singer 1974).

FORAGING: Major food: Fish. Substrate: Water. Techniques: Hovering and diving, slow level flying 50 to 100 feet (15.2 to 30.5 m) above water. Preferred feeding habitat: Shallow water areas of streams, shoals of lakes (where fish are close to surface).

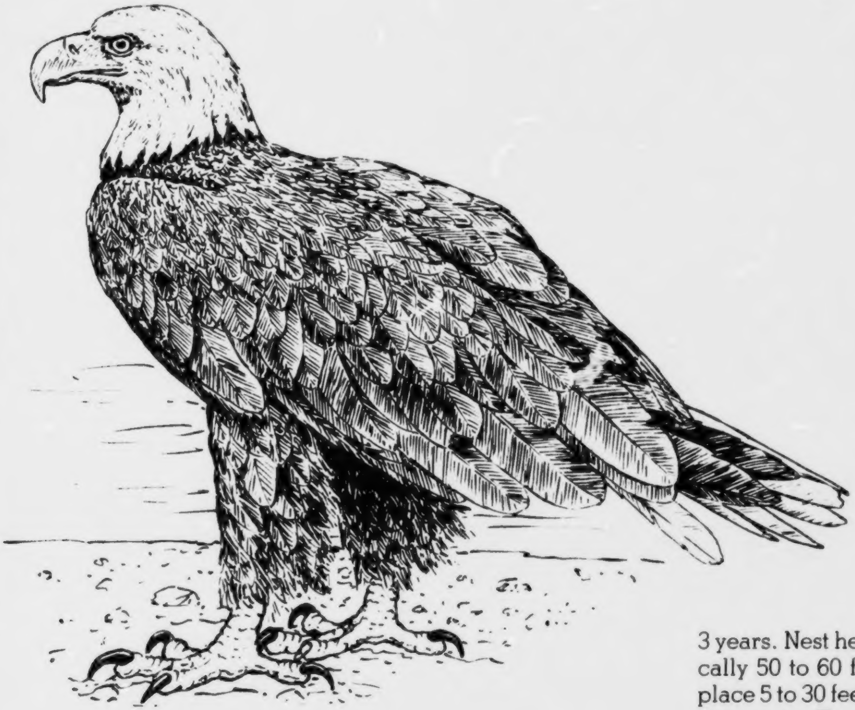
COMMENTS: Ospreys show strong attachment to breeding grounds, returning to the same nest or area year after year. The Osprey population in the lower Connecticut River-Long Island area is increasing in response to the DDT ban and egg transplants from Maryland birds.

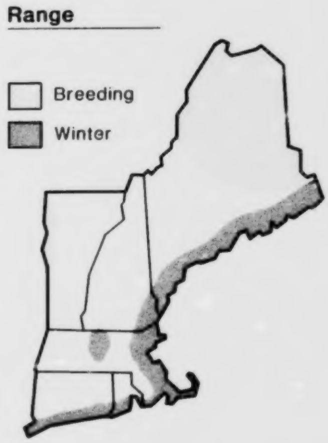
KEY REFERENCES: Bent 1937, Forbush 1929, Ogden 1975.

Bald Eagle

(Haliaeetus leucocephalus)

A.O.U. No. 352.0





RANGE: Breeding: Once bred throughout North America, but today occurs mainly in Alaska, near the Great Lakes, Chesapeake Bay and in s. Florida. In Maine nests s. to Merrymeeting Bay and on Swan Island (P. Cross, personal communication). Winter: Southern Canada, w. to Alaska, s. to Florida and s. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and endangered.

HABITAT: Breeding: Forests and open areas, mountains, usually near large bodies of water with abundant fish. Wintering: Coast, and inland where ice-free waters allow access to fish. Also ice-bound lakes where birds feed on carrion such as deer carcasses. Birds congregate at night roosts and feeding areas.

SPECIAL HABITAT REQUIREMENTS: Large bodies of water that contain fish, large living trees for nesting. Pilot tree (access points to and from nest) and perch trees are important. Insolation from human disturbance may be a habitat requirement (U.S. Forest Service 1977).

NESTING: Egg dates: March 6 to May 14, New York (Bull 1974:174). Clutch size: 1 to 3, typically 2. Incubation period: About 35 days. Nestling period: 72 to 74 days (Bent 1937). Broods per year: 1. Age at sexual maturity: 3 years. Nest height: 35 to 100 feet (10.7 to 30.5 m). Typically 50 to 60 feet (15.2 to 18.3 m). Nest site: An eyrie place 5 to 30 feet (1.5 to 9.1 m) below the top of a very tall living tree. Tree species is not as important as size, shape and proximity to other nesting Eagles. Sites with unobstructed view of surrounding terrain are preferred. Same nest is often used year after year. Occasionally uses cliffs for nesting.

TERRITORY SIZE: A pair of southern Bald Eagles defended an area that extended 0.5 mile (0.8 km) in all directions from the nest (Broley 1947). Usually a minimum of several square miles in area (Pough 1951:158).

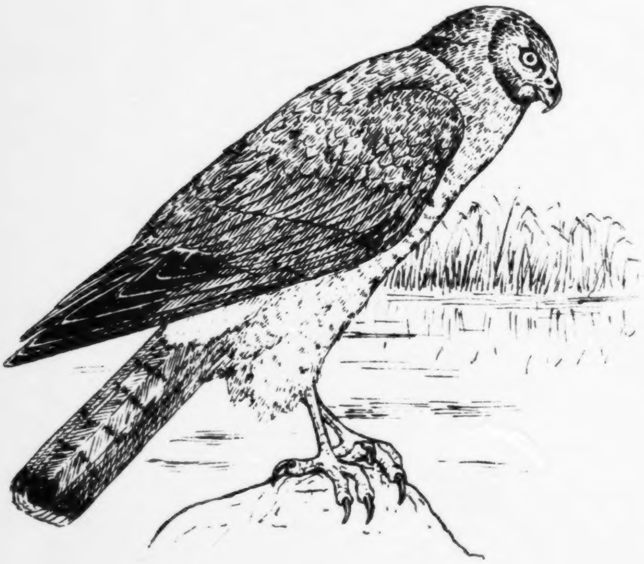
FORAGING: Major foods: Fish (staple), small to medium mammals, large birds, turtles, carrion. Substrates: Water, ground. Techniques: Soaring, hawking, hovering and diving, wading. Preferred feeding habitat: Lakes, rivers, coastal bays, and inlets.

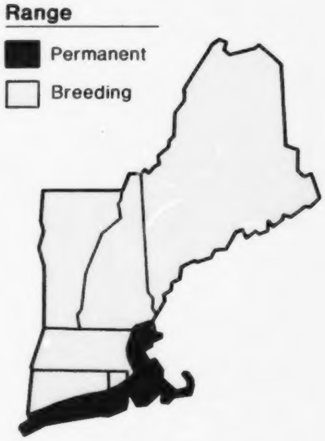
COMMENTS: Bald eagles use snags for perching. They show strong attachment to old nesting territories and nest sites. When nest is destroyed they often rebuild nearby. When suitable trees are lacking, they may resort to using small weak trees (Broley 1947).

KEY REFERENCES: Bent 1937, Broley 1947, Forbush 1929.

Northern Harrier
(Circus cyaneus)

A.O.U. No. 331.0





RANGE: Breeding: Quebec, s. to se. Virginia and w. Winter: Southern New England, w. across the continent and s. to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to locally common at coastal marshes.

HABITAT: Breeding: Open country, fresh or salt marshes, swamps and bogs, wet meadows. Wintering: Coastal marshes.

SPECIAL HABITAT REQUIREMENTS: Open country with herbaceous or low woody vegetation for nest concealment.

NESTING: Egg dates: April 20 to June 25, New York (Bull 1974:177). Clutch size: 3 to 9, typically 4 to 6. Incubation period: About 24 days. Age at first flight: 5 to 6 weeks. Broods per year: 1. Nest site: On ground in tidal marshes, dry fields, cut-over areas, swamps with low shrubs and clearings, sometimes built up over water on a stick foundation, sedge tussock or willow clump. Foundation of nest may be 18 inches (45.7 cm) high in wet situations (Harrison 1975:39).

TERRITORY SIZE: Unknown. Birds defend nest areas from marsh hawks and other species.

HOME RANGE: 0.38 square mile (.98 km^2) to 3.89 square miles (10.1 km^2) in Michigan (Craighead and Craighead 1969:259, 260). Winter range: 0.55 square mile (1.4 km^2) and 0.63 square mile (1.6 km^2) for a pair and a single hawk, respectively (Craighead and Craighead 1969:26).

SAMPLE DENSITIES: 3 pairs nested within 400 yards (366 m) of each other (Bent 1937). 4 pairs per square mile (1.5 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: Small mammals (staple), especially rodents, shrews and lagomorphs, small birds, amphibians, reptiles, insects, and occasionally carrion. Substrate: Meadow grasses. Techniques: Hovering and diving, quartering low over the ground.

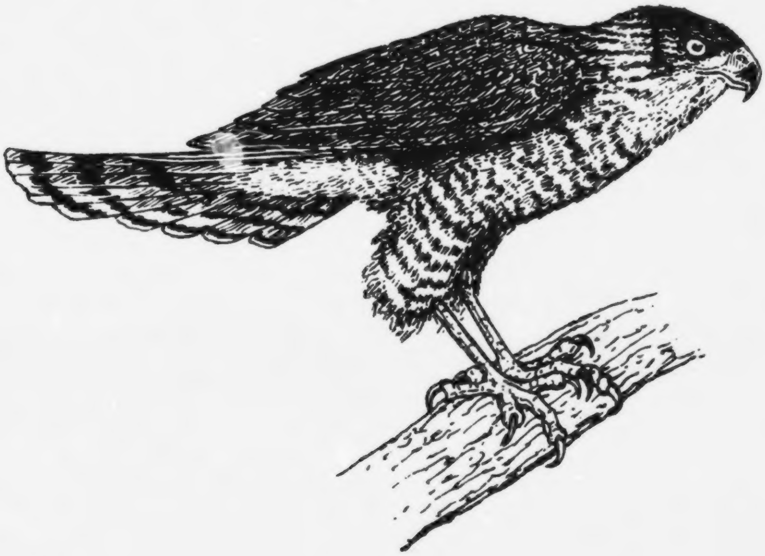
COMMENTS: Possibly mates for life. Males are occasionally polygynous, defending two nests in the same area. Marsh hawks generally roost on ground or perch on very low objects such as fence posts and tree stumps. Populations have recently declined in New York State (Bull 1974:177).

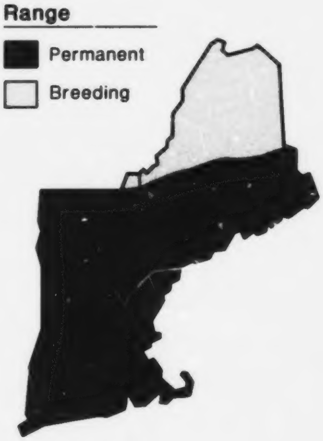
KEY REFERENCES: Bent 1937, Hausman 1966, Hecht 1951, Randall 1940.

Sharp-shinned Hawk

(Accipiter striatus)

A.O.U. No. 332.0





RANGE: Breeding: Newfoundland s. to Georgia (mountains), and w. Winter: Central New England w. to Ohio and s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (Maine) in breeding season. Uncommon to rare in winter.

HABITAT: Breeding: Open mixed or coniferous woodlands, clearing, edges. A bird of cold-temperate conifer forests and temperate deciduous woodlands. Wintering: Same as breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Extensive open mixed woodlands that are free from human disturbance.

NESTING: Egg dates: April 16 to June 21, New York (Bull 1974:179). Clutch size: 3 to 8, typically 4 or 5. Incubation period: 21 to 24 days. Nestling period: 24 to 27 days (males 24 days, females 27 days (Platt 1976). Broods per year: 1. Nest height: 6 to 90 feet (1.8 to 27.4 m), typically 30 to 35 feet (9.1 to 10.7 m). Nest site: Most often in a conifer (white pine in Massachusetts, hemlock in New York) (Bent 1937:96, Bull 1974:179). Seldom in a deciduous tree (oak, beech). Nest is typically placed on a limb against the trunk of a medium tree and is well concealed. Nest tree is often at the edge of a clearing. Sometimes repairs and uses an old nest.

HOME RANGE: 0.26 square mile to 0.51 square miles in Moose, Wyoming (Craighead and Craighead 1969:263).

FORAGING: Major foods: Small to medium birds (staple); small mammals, mainly rodents, shrews, moles and young lagomorphs. Substrates: Forest floor, meadow grasses, bushy pastures. Techniques: Hawking, diving to ground and pouncing. Preferred feeding habitat: Generally forages over open country — avoids hunting in heavily wooded areas.

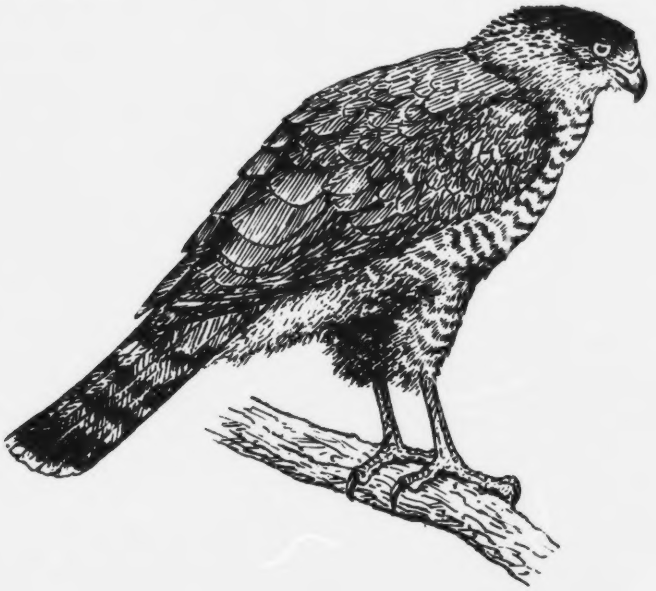
COMMENTS: Platt (1976) found that Sharp-shinned Hawks' nests in Utah were most often placed in dense, small conifer groves that were surrounded by deciduous trees. Often in heavily wooded areas in New York State (Bull 1974:179).

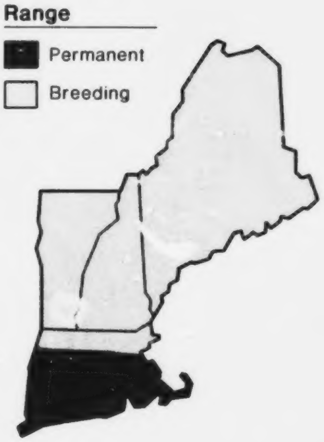
KEY REFERENCES: Bent 1937, Craighead and Craighead 1969, Mendall 1944, Platt 1976.

Cooper's Hawk

(Accipiter cooperii)

A.O.U. No. 333.0





RANGE: Breeding: Nova Scotia w. to w. Ontario, s. to Florida and the Gulf Coast. Winter: Southern New England and Ohio, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon in winter (Massachusetts) to rare (Maine) in breeding season.

HABITAT: Breeding: Extensive deciduous or mixed woodlands that are dense or open, scattered woodlots interspersed with open fields. Occupies similar forest niche as Sharp-shinned Hawk but has broadened its habitat by moving into more open agricultural areas. Floodplain forests and wooded swamps. Wintering: Similar to breeding habitat.

NESTING: Egg dates: April 20 to June 16, New York (Bull 1974:179). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 24 days. Nestling period: 21 to 25 days. Broods per year: 1. Nest height: 20 to 60 feet (6.1 to 18.3 m), typically 35 to 45 feet (10.7 to 13.7 m). Nest site: In a conifer (often white pine), but more often in a hardwood tree. Nest is commonly placed on a horizontal branch or in a crotch near the trunk. Frequently uses old crow nests. Cooper's Hawks often return to same nest site year after year (Bull 1974:179).

HOME RANGE: 0.07 square mile (0.2 km^2) to 2.05 square miles (5.3 km^2) in Michigan (Craighead and Craighead 1969:258, 260). Average winter range: 1.5 to 2 miles (2.4 to 3.2 km) in diameter (Craighead and Craighead 1969).

SAMPLE DENSITIES: 0.2 pairs per 100 acres (40 ha) in mixed forest-farmland habitat in Maryland (Stewart and Robbins 1958:110).

FORAGING: Major foods: Small to medium birds and small mammals, especially rodents and young lagomorphs; occasionally eats insects and amphibians. Substrates: Forest floor, meadow grasses. Techniques: Hawking, diving to ground and pouncing. Preferred feeding habitat: Cooper's Hawks hunt primarily in woodlots away from nest area and in open areas near woodland.

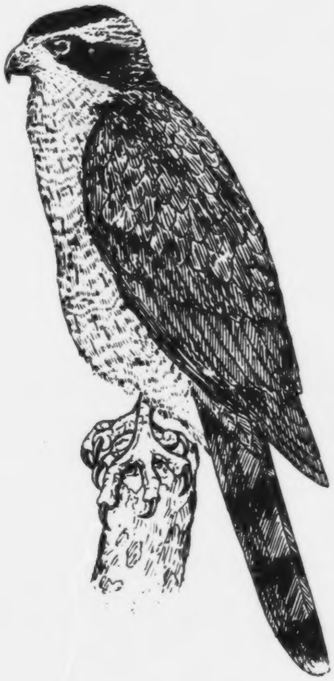
COMMENTS: Cooper's hawks usually hunt on the wing low to the ground or just above tree-top level.

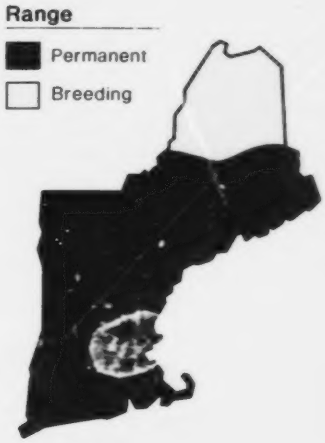
KEY REFERENCES: Bent 1937, Craighead and Craighead 1969, Forbush 1929.

Northern Goshawk

(Accipiter gentilis)

A.O.U. No. 334.0





RANGE: Breeding: Canada s. to New York, nw. Connecticut and Pennsylvania and w. to Lake Erie. Winter: Southern Canada, s. to Virginia and Illinois.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare

HABITAT: Breeding: Interiors of remote and heavily forested areas, coniferous and mixed forests. Wintering: Same as breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Extensive mixed woodlands with large trees for nesting.

NESTING: Egg dates: April 20 to May 15, New York (Bull 1974:182). Clutch size: 2 to 5, typically 3 or 4. Incubation period: About 28 days. Nestling period: About 42 days. Broods per year: 1. Nest height. 20 to 75 feet (6.1 to 22.9 m), typically 30 to 40 feet (9.1 to 12.2 m). Nest site: Prefers to nest in a hardwood tree in mixed woodlands. Nest may be placed in crotch close to trunk or out on a limb. Often builds in beech, birch, poplar, or occasionally pine or hemlock. Builds on top of old nest (own or other hawk's) or makes new nest.

HOME RANGE: 0.82 square miles (2.1 km^2) (observed area) in Moose, Wyoming, in 1947 (Craighead and Craighead 1969:263).

FORAGING: Major foods: Small to medium birds (staple); mammals, especially rodents and lagomorphs. Substrates: Ground, trees and shrubs, air. Techniques: Hawking, diving to ground and pouncing. Preferred feeding habitat: Clearings and brushy openings.

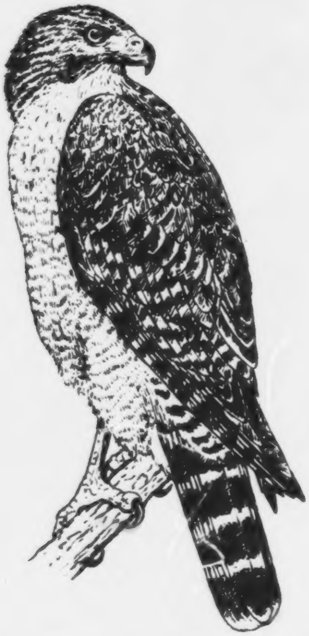
COMMENTS: Caches food. Birds are able to maneuver in dense woods in search of prey. 28 of 37 (76 percent) goshawk stomachs in Maine contained the remains of birds (Mendall 1944). Numbers of breeding birds have recently increased greatly in the mountains of New York (Bull 1974:180).

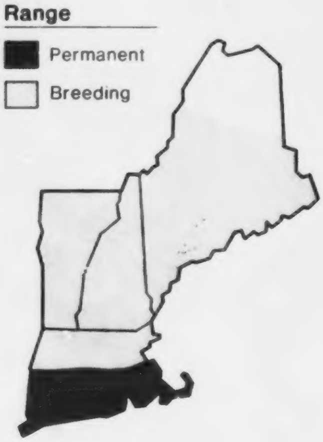
KEY REFERENCES: Bent 1937, Craighead and Craighead 1969, Forbush and May 1939.

Red-shouldered Hawk

(Buteo lineatus)

A.O.U. No. 339.0





RANGE: Breeding: Throughout the Eastern United States. Winter: Southern New England w. to Michigan, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Moist hardwood or mixed woodlands, wooded swamps, bottomlands and wooded margins of marshes often close to cultivated fields. Rare in mountains. Wintering: Same as breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Cool, moist, lowland forests with tall trees for nesting.

NESTING: Egg dates: March 25 to May 26, New York (Bull 1974:186). Clutch size: 2 to 4, typically 3. Incubation period: 28 days. Nestling period: 35 to 42 days. Broods per year: 1. Nest height: 20 to 60 feet (6.1 to 18.3 m), typically 35 to 45 feet (10.4 to 13.7 m). Nest site: Shows little preference for any one species of tree for nesting but usually chooses one that is tall. Nest is typically placed in a main fork close to trunk. May repair and use old nest but usually builds new one. Birds show strong attachment to nest site by returning year after year.

HOME RANGE: 180 acres (72.9 ha) in Kansas (Fitch 1958). 0.03 square mile to 0.60 square mile (0.07 to 1.6 km^2) in Michigan. Winter ranges in Michigan were usually between 1.5 and 2 square miles (3.8 to 5.2 km^2) (Craighead and Craighead 1969:24).

SAMPLE DENSITIES: 1 pair per 0.8 square miles (1 pair/2.1 km^2) in floodplain forest in Maryland (Stewart 1949). About 1 pair per 120 acres (48.6 ha) of floodplain in Maryland (Henny et al. 1973).

FORAGING: Major foods: Amphibians, reptiles, crustaceans (crayfish), insects, mammals such as small rodents, shrews, and moles. Also takes young birds of many species. Substrates: Forest floor, meadow grasses. Techniques: Hawking (while soaring or sallying from a perch), diving to ground and pouncing. Preferred feeding habitat: In addition to foraging in nesting habitat, birds hunt in drier woodland clearings and fields.

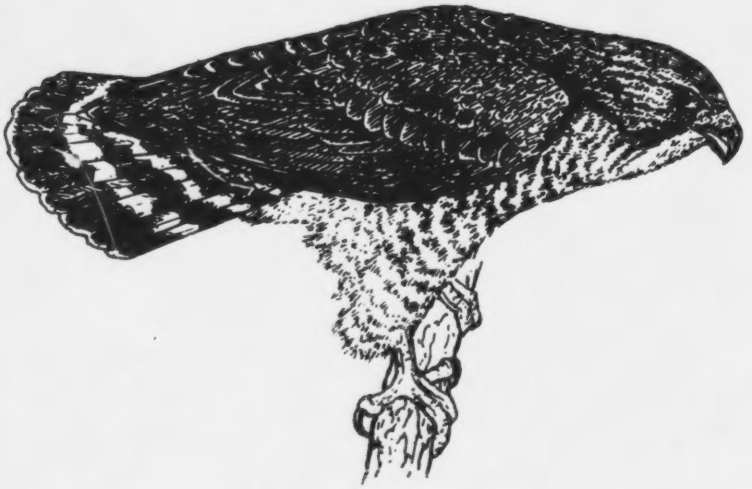
COMMENTS: Pairs may remain mated for life. In Massachusetts, Red-shouldered Hawks nested in dry woods both near and away from water (Bent 1937:184).

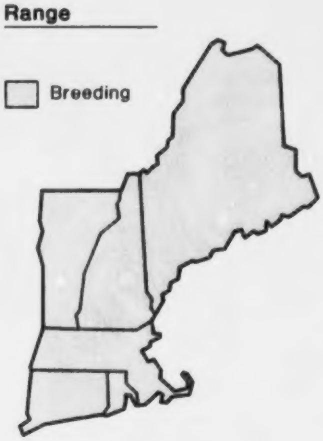
KEY REFERENCES: Bent 1937, Craighead and Craighead 1956, Ernst 1945, Henny et al. 1973, Stewart 1949.

Broad-winged Hawk

(Buteo platypterus)

A.O.U. No. 343.0





RANGE: Breeding: Throughout the Eastern United States from s. Canada to the Gulf States. Winter: Southern tip of Florida, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Breeding: Dry forests (mostly deciduous and mixed, occasionally in conifers), wooded hillsides generally away from human habitations. Prefers continuous woods, shuns open country. Seems to prefer to nest along untraveled woods roads, at least in New England.

SPECIAL HABITAT REQUIREMENTS: Extensive woodlands (Bull 1974:188).

NESTING: Egg dates: April 27 to June 26, New York (Bull 1974:188). Clutch size: 1 to 4, typically 2 or 3. Incubation period: 28 to 35 days. Nestling period: 29 to 30 days. Broods per year: 1. Age at sexual maturity: 2 years. Nest height: 3 to 80 feet (1.0 to 24.4 m). Typically 24 to 40 feet (7.3 to 12.2 m). Nest site: Shows little preference for kind of nest tree — generally choosing one of the largest and most abundant species. Typically locates nest in crotch next to trunk.

FORAGING: Major foods: Amphibians, reptiles, insects, small mammals such as shrews (staple) and mice, occasionally takes young birds. Substrate: Forest floor. Techniques: Hawking, soaring, diving, and pouncing. Preferred feeding habitat: Prefers deep, shady woodlands, sometimes ventures out over meadows.

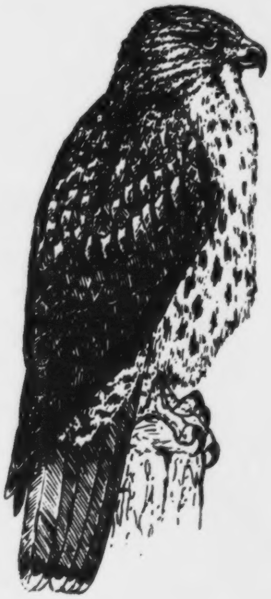
COMMENTS: Possibly mates for life. 14 trees supporting nests in deciduous woods in New York had a mean d.b.h. of 21.3 inches (54.1 cm) (range 16.6 to 29.2 inches) (42.1 to 74.2 cm). The hawks showed a preference for nesting in yellow birch (Matray 1974).

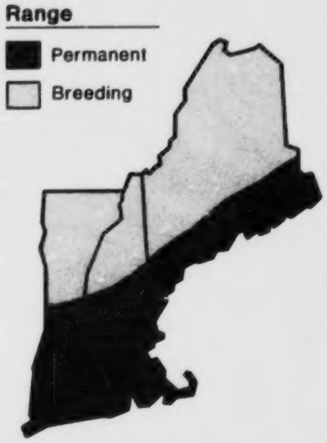
KEY REFERENCES: Bent 1937, Burns 1911, Matray 1974.

Red-tailed Hawk

(Buteo jamaicensis)

A.O.U. No. 337.0





RANGE: Breeding: Alaska and Canada s. to Central America and the West Indies. Winter: Withdraws from northern portions of breeding range to c. New England and s. Michigan, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Massachusetts) to uncommon (Maine) in breeding season. Locally common to uncommon in winter.

HABITAT: Breeding: Deciduous and mixed woodlands interspersed with meadows, brushy pastures, open bogs, and swampy areas. Common to both the cold-temperature conifer forests and temperate deciduous woodlands. Wintering: Similar to breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Large trees for nesting and perching.

NESTING: Egg dates: March 8 to May 16, New York (Bull 1974:184). Clutch size: 1 to 5, typically 2 or 3. Incubation period: About 28 days. Broods per year: 1. Age at first flight: 4 to 5 weeks. Nest height: 35 to 90 feet (10.7 to 27.4 m). Nest site: Usually in a tall tree in or at the edge of a woodland, or in isolated tree in an open situation. Oak or white pine is often used as nest tree in Massachusetts. In New York, beech, birch, and maple are commonly used (Bent 1937:151-152).

TERRITORY SIZE: 80 to 200 acres (32.4 to 81.0 ha) (excluding peripheral areas) in California (Fitch et al. 1946).

HOME RANGE: Breeding season: 0.30 square mile (minimum) to 2.15 square miles (maximum) (0.8 to 5.6 km^2) in Wyoming and Michigan, respectively. Winter: Ranges of up to 4 square miles (10.4 km^2) were measured in Michigan (Craighead and Craighead 1969:24, 260, 263).

SAMPLE DENSITIES: 1 pair per 2.2 square miles (1 pair/5.7 km^2) in deciduous woodland in New York (Hagar 1957). 1 pair per 4.1 square miles (1pair/10.6 km^2) in fields and woodlands (Gates 1972). 1 pair per 0.5 square mile (1 pair/1.3 km^2) in pine-oak habitat in California (Fitch et al. 1946).

FORAGING: Major foods: Small mammals, especially rodents such as meadow mice, chipmunks, and squirrels; also takes amphibians, reptiles, nestling birds, insects, and carrion; occasionally kills domestic animals (Orians and Kuhlman 1956). Substrates: Short meadow grasses. Techniques: Soaring, diving, and pouncing. Preferred feeding habitat: Open field with short grasses and weeds and scattered trees for perching.

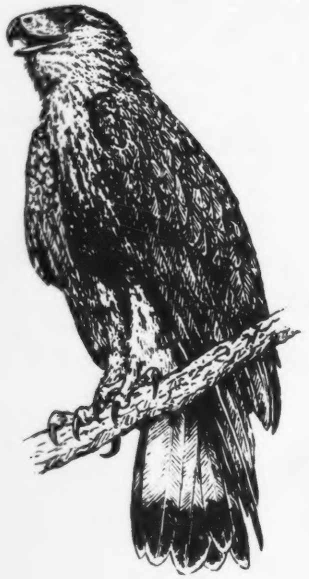
COMMENTS: Birds possibly mate for life. Red-tails generally select the largest and tallest trees for nesting (over 35 feet (10.7 m) tall). They utilized small woodlots in New York State, the smallest being 15 acres (6.1 ha). Occasionally they used isolated trees up to 50 yards (45.7 m) from woods (Hagar 1957). Gregarious in winter.

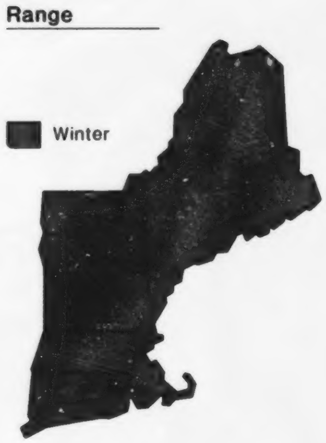
KEY REFERENCES: Craighead and Craighead 1969, Fitch et al. 1946, Gates 1972, Hagar 1957, Orians and Kuhlman 1956.

Rough-legged Hawk

(Buteo lagopus)

A.O.U. No. 347.0





RANGE: Breeding, Arctic North America. Winter: Arctic, s. to North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare but sometimes very common in winters when northern foods are scarce.

HABITAT: Wintering: Restricted to open areas, bushy fields, open meadows and marshes, especially in coastal areas. Generally very infrequent inland in southern New England. Needs open snowless areas (C. Anderson, personal communication).

SPECIAL HABITAT REQUIREMENTS: Open country.

HOME RANGE: Winter: Ranges of two birds in Michigan were 0.68 square miles (1.8 km^2) and 1.69 square miles (4.4 km^2). The usual range may be 6 square miles (10.4 to 15.5 km^2) (Craighead and Craighead 1969:23).

FORAGING: Major foods: Winter — mammals, especially mice and shrews (staple). Also feeds on carrion. Substrates: Open ground — fields, pastures. Techniques: Hovering, hawking, pouncing. Preferred feeding habitat: Grassy areas, fallow fields.

COMMENTS: Numbers declined in the early part of the 20th century because of wholesale slaughter brought about by the belief that all raptors were chicken and game bird killers. Rough-legged Hawk populations are highly irruptive with largest numbers generally occurring during years of meadow mouse (Microtus) abundance (Bull 1974:189). This species is more numerous from central New York west to the Lakes Region.

KEY REFERENCES: Bent 1937, Craighead and Craighead 1969, Forbush 1929.

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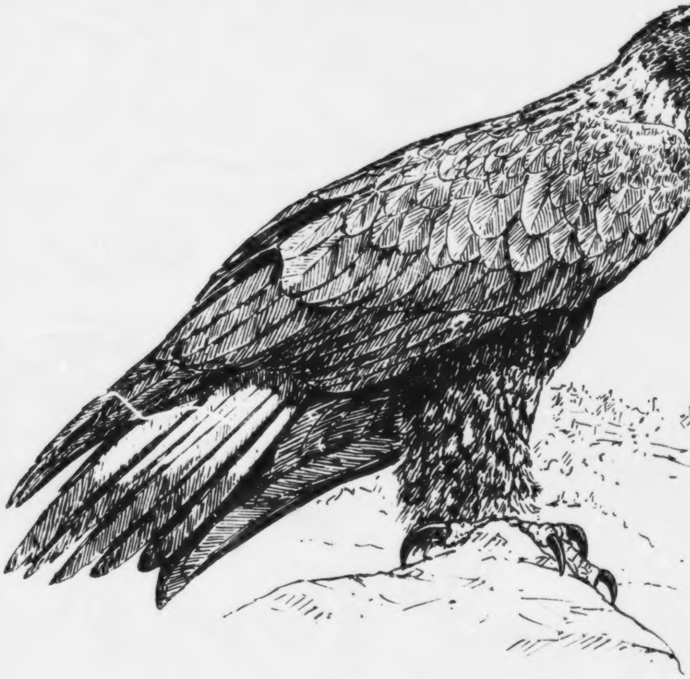
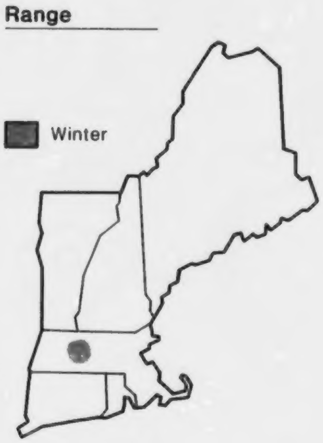
Golden Eagle

(Aquila chrysaetos)

A.O.U. No. 349.0





RANGE: Breeding: Edge of arctic tundra across North America, s. to the mountains of North Carolina, Mexico, and California. Has nested in Vermont, New Hampshire, and Maine. Winter: Withdraws from northernmost parts of breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Very rare in all seasons.

HABITAT: Breeding: Cold-temperate conifer forests, rugged mountain ranges near open land for hunting. Wintering: Timbered portions of New England with open expanses for hunting.

SPECIAL HABITAT REQUIREMENTS: Elevated nest sites, especially cliffs. Broad expanses of open land for hunting.

NESTING: Clutch size: 1 to 4, typically 2 or 3. Incubation period: About 43 days. Age at first flight: 12 weeks. Broods per year: 1. Nest site: Usually on a cliff, crag, or less commonly in a large tree. Pairs often attend alternate unoccupied nests in the vicinity of active nest, until the eggs are laid.

TERRITORY SIZE: 20 to 60 square miles (51.8 to 155.4 km^2) with an average of about 36 square miles (93.2 km^2) (Pough 1951:155).

HOME RANGE: 50 to 100 square miles (130 to 259 km^2) (Spofford 1971).

SAMPLE DENSITIES: 56 breeding pairs per 240-km (149-mile) stretch of Snake River in Idaho. 1 pair per 8 km (5.0 miles) of river (Craighead and Craighead 1969). 1 pair per 5 km (3.1 miles) of river (Spofford 1971). Density is probably a function of availability of suitable nest sites, adequate prey, and minimum nesting territory size (Beecham and Kochert 1975).

FORAGING: Major foods: Small to medium mammals (preferred), medium to large birds, reptiles, carrion (when live food is scarce). Substrate: ground. Techniques: Soaring, diving, and pouncing. Preferred feeding habitat: Open country — burns, marshes, bogs, hillside meadows, bald knobs, and fields.

COMMENTS: Pairs probably mate for life. A few Golden Eagles breed in the Adirondacks of New York but very few young fledge (Spofford 1971). The bird is an irregular winter wanderer in the Northeast.

KEY REFERENCES: Beecham and Kochert 1975, McGahan 1968, Singer 1974, Woodgerd 1952.

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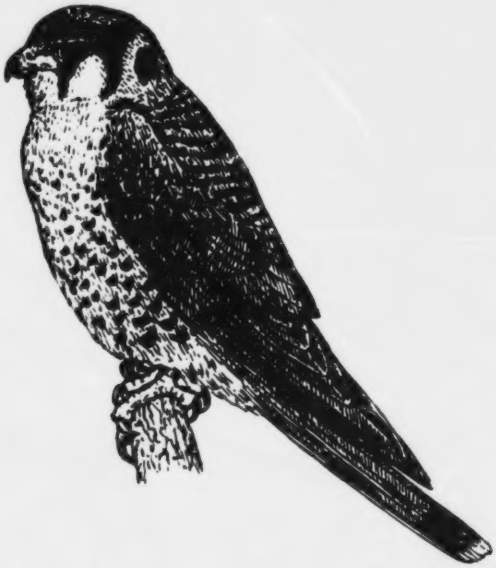
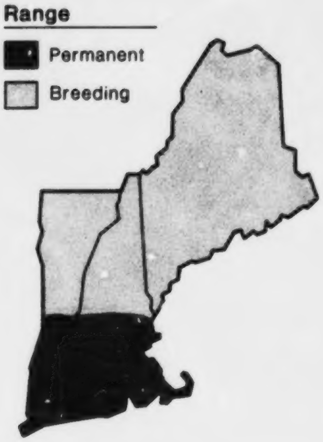
American Kestrel

(Falco sparverius)

A.O.U. No. 360.0





RANGE: Breeding: Newfoundland and Quebec, w. to Alaska, s. to South America. Winter: Central New England, w. and s. Northern limit of wintering population depends on snow depth.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Open areas with a few trees containing cavities, wet meadows, forest edges near open ground, orchards, farm buildings, cities. Wintering: Same as breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Nest trees with d.b.h. greater than 12 inches (30.5 cm) for nesting (Thomas et al. 1979). Open country with low vegetation. Elevated perches from which to sight prey. Snags.

NESTING: Egg dates: April 5 to June 29, New York (Bull 1974:202). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 29 to 31 days. Nestling period: 30 to 31 days. Broods per year: 1. Nest height: 4 to 50 feet (1.2 to 15.2 m), typically 10 to 35 feet (3.0 to 10 m). Nest site: In cavities of trees, under eaves of buildings, cliffs, rarely in old nests of other birds. Accepts man-made nest boxes. Roest (1957) found that kestrels frequently nested in abandoned flicker holes or natural cavities located 6.5 to 35 feet (2 to 10 m) above the ground.

TERRITORY SIZE: 351 acres (142 ha) (Hardin and Evans 1977).

HOME RANGE: Breeding and winter home ranges were of similar sizes in Wyoming. Both covered about 2 square miles (5.2 km^2) (Craighead and Craighead 1969). Average diameter of 7 home ranges was 0.31 mile (0.5 km) (Smith et al. 1972). Average diameter of 1.4 miles (2.2 km) for 4 nests in farming area (Enderson 1960).

SAMPLE DENSITIES: 33 pairs per 6.9 square miles (33 pair/18 km^2) in nest boxes in Holland (Brown 1976). 6 pairs per 0.5 square mile (6 pairs/1.3 km^2) in nest boxes in Pennsylvania (Nagy 1963). Maximum pairs 0.28 per 100 acres (40 ha) (Hardin and Evans 1977). 45 pairs per square mile (45 pairs/2.6 km^2) in central Utah (Smith et al. 1972). 0.44 pairs per square mile (0.16 pairs/km^2) in Michigan (Craighead and Craighead 1969).

FORAGING: Major foods: Insects (staple) especially grasshoppers, crickets and beetles; mammals such as small mice, shrews; small birds; reptiles, and amphibians. Substrates: Meadow grasses air. Techniques: Hawking, hovering, diving to ground.

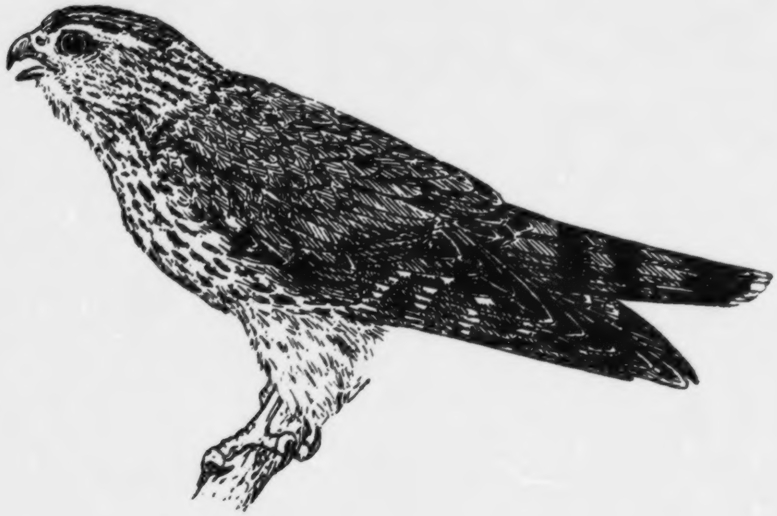
COMMENTS: Pairs possibly remain mated for life. Occasionally polygamy may occur (Roest 1957). Food caching is commonly practiced.

KEY REFERENCES: Balgooyen 1976, Bent 1938, Roest 1957, Smith et al. 1972, Willoughby and Kape 1964.

Merlin

(Falco columbarius)

A.O.U. No. 357.0



Range
▨ Breeding

RANGE: Breeding: Below timberline in Alaska and Canada s. to South Dakota and the tip of n. New York. Winter: Gulf states and s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare.

HABITAT: Breeding: Open coniferous forest, marshes, fields in migration.

NESTING: Egg dates: May through June. Clutch size: 4 to 5. Incubation period: 30 days. Nest height: 35 to 60 feet (10 to 15 m). Nest site: On ledges, in tree cavities, on old nests of other birds (Harrison 1975:47).

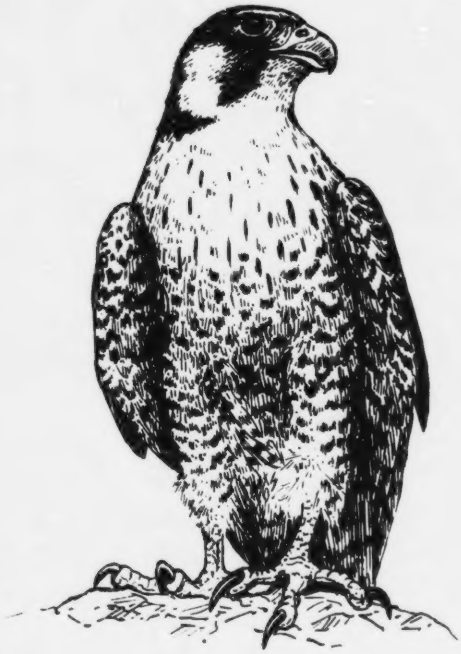
FORAGING: Major foods: Small birds, small mammals, and insects. Substrates: Air, ground (grassy areas). Techniques: Perch and pounce or hawking. Preferred feeding habitat: hunts in a variety of open habitats—marshes, beaches, mudflats, and fields (Godfrey, 1979:103).

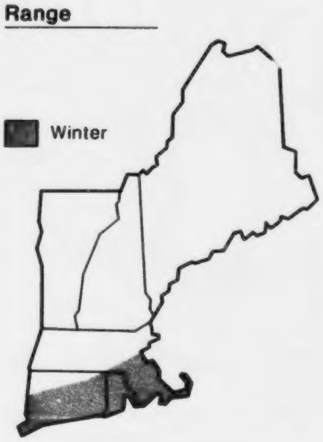
KEY REFERENCES: Bent 1938, Hausman 1966.

Peregrine Falcon

(Falco peregrinus)

A.O.U. No. 356.0





RANGE: Breeding: Arctic North America, formerly s. to n. Georgia, and Texas but now believed to be extinct (as a breeding bird) in the Eastern United States. Winter: Massachusetts (rarely), w. to British Columbia, s. to n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and endangered.

HABITAT: Breeding: Typically on high, rocky cliffs of mountains; often near a river, stream, or other body of water; coastal bays. Sometimes breeds in cities. Birds commonly return to same nest site in successive years. Wintering: Birds winter primarily along the Atlantic Coast on barrier beaches. A few winter in cities, roosting on tall buildings.

SPECIAL HABITAT REQUIREMENTS: High cliffs for nesting, a clear view of surroundings, habitats free of harmful pesticides, ready supply of prey species, water within 0.5 to 1.0 mile (0.8 to 1.6 km) of nest site. Small amounts of gravel or soil in nest hollow may be required for laying (Bull 1974:196).

NESTING: Egg dates: March 26 to May 31, New York (Bull 1974). Clutch size: 2 to 6, typically 4. Incubation period: 30 days. Age at first flight: 5 to 7 weeks. Broods per year: 1. Nest site: Builds little or no nest. Lays eggs in a scraped depression on a rocky shelf on side of a high ledge, cliff, bluff, or crag. Occasionally lays eggs on the broken top of a very large tree, roof or ledge of tall building.

SAMPLE DENSITIES: Hickey (1942) listed 19 pairs per 10,000 square miles (19 pairs/25,900 km^2) around New York City. Average distance between pairs was about 1 mile (1.6 km) in an unusually dense island population along coast of British Columbia (Beebe 1960 in Hickey and Anderson 1969). About 1 pair per 2,000 square miles (1 pair/5,180 km^2) was estimated for parts of w. North America where Peregrine was considered common and less than 1 pair per 20,000 square miles (1 pair/51,800 km^2) where rare (Bond 1946 in Hickey and Anderson 1969).

FORAGING: Major foods: Small to large birds (staple), occasionally takes mammals or dead fish. Substrate: Air. Techniques: Hawking (grasping in midair) or striking in midair and recovering prey on ground.

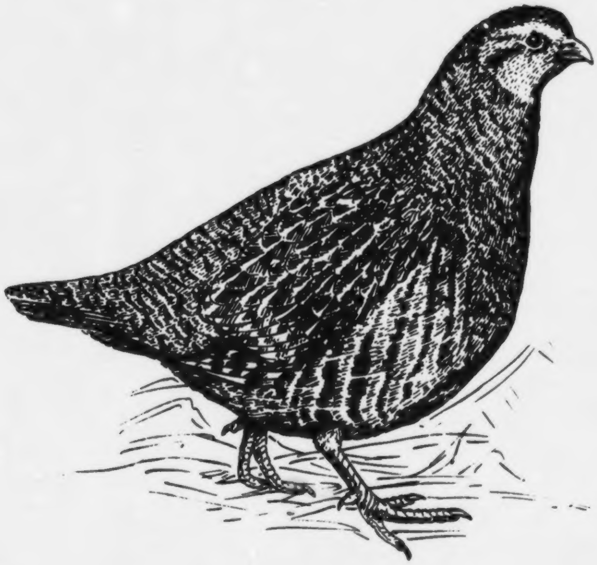
COMMENTS: Presently Peregrines are breeding in the Northeast only in coastal areas of New Jersey and one cliff site in New Hampshire. Recovery plans are under way to restore birds to their original breeding ranges. Releases have been made at a number of sites in Massachusetts, Vermont, New Jersey, New Hampshire, and New York.

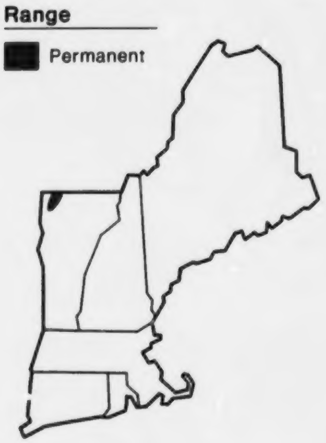
KEY REFERENCES: Brown 1976, Hausman 1966, Hickey 1942 and 1969.

Gray Partridge

(Perdix perdix)

A.O.U. No. 288.1





RANGE: Breeding: A profusely stocked species with the highest populations in the northern Great Plains region from w. Wisconsin, w. to c. Montana and through s. Manitoba to se. Alberta. The northwest populations inhabit the agricultural areas of Washington, Oregon, and Idaho. Disjunct populations are in s. Wisconsin, n. Illinois, s. Michigan, ne. Indiana and nw. Ohio. Smaller colonies are established in n. New York, nw. Vermont, c. Pennsylvania, Nova Scotia, s. New Brunswick, and Prince Edward Island. Winter: same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Near the edges of hayfields and grain fields. Winter: Same as breeding habitat. Typically remain in open areas, but may seek shelter during periods of strong winds.

SPECIAL HABITAT REQUIREMENTS: Availability of grain crops and grasslands for nesting and brooding cover.

NESTING: Nest dates: Late April a nest is made in grassy cover. Edge is a strong influence on nest sites (Yeatter 1934). Egg dates: Mid- to late June (Edminster 1954:372). Clutch size: 16.4 average. Incubation period: 24 to 25 days. Brood period: The young are fully plumaged and grown in about 10 weeks (Edminster 1954:373).

SAMPLE DENSITIES: On three 160-acre study areas in Michigan, Yeatter (1934) reported one bird for 4.4, 11, and 13.3 acres. Some evidence of Gray Partridge populations following 10-year cycles of abundance, similar to native grouse species (Aldrich 1947).

FORAGING: Major foods: Green leafy materials, seeds of weedy herbs and cultivated grains. Insects occasionally taken by adults. Chicks insectivorous during the first 2 weeks of life (Edminster 1954:378). Grit required throughout the year.

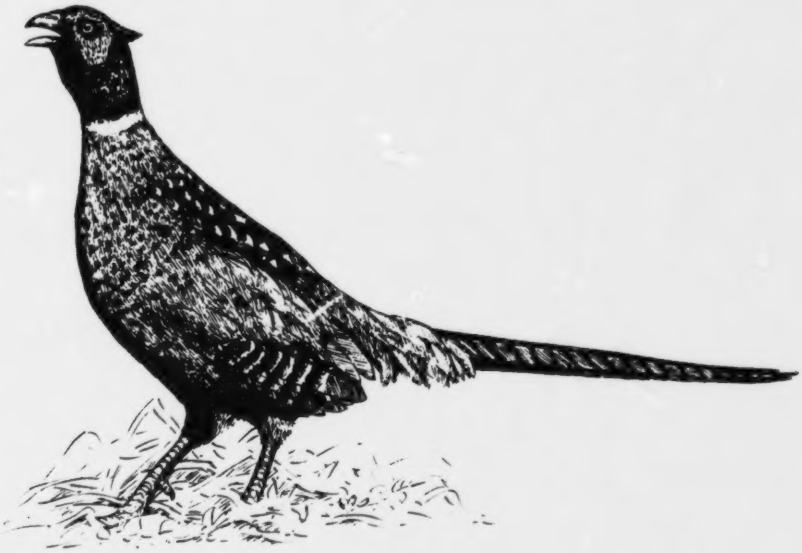
COMMENTS: A native species of Europe and southwestern Asia. Originally introduced in the United States in the late 18th century.

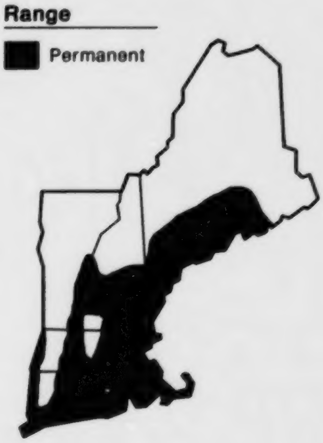
KEY REFERENCES: Edminster 1954, Johnsgard 1973.

Ring-necked Pheasant

(Phasianus colchicus)

A.O.U. No. 309.1





RANGE: Breeding: Central Maine, w. to British Columbia, s. to Maryland and Kentucky. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Massachusetts) to uncommon (Maine).

HABITAT: Breeding: Open cultivated fields of grass or grain, fallow fields, bushy pastures, hedgerows by roadsides, cut-over land, open ungrazed woodlots. Agricultural lands provide the best habitat. Absent in mountains, avoids forested areas. Wintering: Birds seek areas with dense protective cover, often swamps interspersed with thickets.

NESTING: Egg dates: April 14 to July 28, New York (Bull 1974:205). Clutch size: 6 to 15, typically 10 to 12. Incubation period: 23 to 25 days. Nestling period: Less than 1 day (precocial). Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest site: On ground in the open among weeds or cultivated hay or in bushy pastures.

TERRITORY SIZE: The male defends an area for courting, mating, and feeding (females may nest nearby or elsewhere). 11 territories ranged from 3 to 13 acres (1.2 to 5.3 ha) (Twining 1946).

SAMPLE DENSITIES: In the Northeast, densities ranged from less than 1 bird per 100 acres (40. ha) in poor habitat to more than 50 birds per 100 acres (40. ha) in optimum habitat (Allen 1956). At Pelee Island, Ontario, Stokes (1956:367) noted the following densities: 6.2 birds per acre (0.4 ha) in hayfield, 5.7 birds per acre (0.4 ha) in abandoned pasture and 12.4 birds per acre (0.4 ha) in weeds. In autumn, good habitat probably supports 10 to 15 birds per 100 acres (40. ha) (Studholme and Benson 1956).

FORAGING: Major foods: Cultivated grains and weed seeds (staple), buds and soft parts of herbaceous vegetation, fleshy fruits, insects. Substrates: Ground litter, grasses and other low-growing plants, soft earth. Techniques: Gleaning, scratching, and pecking. Preferred feeding habitat: Grain fields and weed fields bordered by hedgerows which afford protective travel lanes.

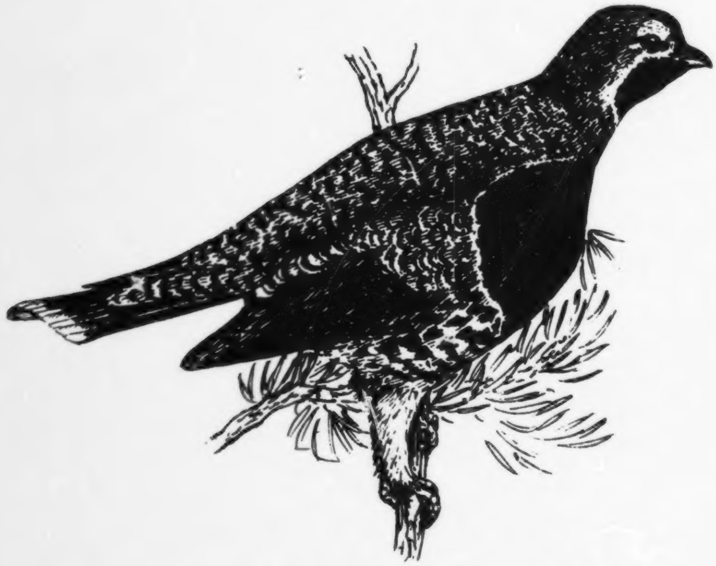
COMMENTS: Pheasants were first successfully introduced from China to Oregon in 1881, but from England to the Northeast (Governor's Island, New York) as early as 1733. Males generally are polygnous; some have monogamous tendencies.

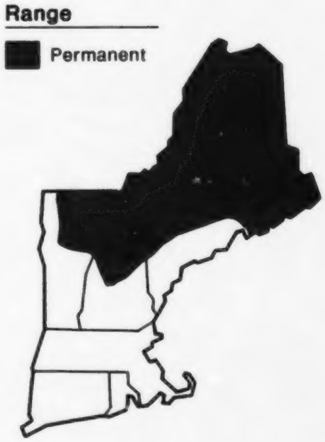
KEY REFERENCES: Allen 1956, Bent 1932.

Spruce Grouse

(Dendragapus canadensis)

A.O.U. No. 298.0





RANGE: Breeding: Northern Quebec, w. to Alaska, s. to n. Vermont, c. New Hampshire, Maine, n. Michigan, and n. Washington. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Wooded tamarack swamps, cedar bogs and muskegs, lowlands bordering sluggish streams in coniferous forests. Rarely uses open meadows or clearings. Wintering: Same as breeding habitat, but birds seek denser areas of forests in extreme cold.

SPECIAL HABITAT REQUIREMENTS: Dense conifers for food and shelter.

NESTING: Egg dates: May 5 to June 24, se. Canada and Maine (Bent 1932: 129). Clutch size: 4 to 10, typically 6 to 8. Incubation period: 22 to 25 days. Nestling period: Less than 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: On ground in brush heaps or under low-hanging conifer branches in open and dense conifer stands.

TERRITORY SIZE: 3 to 21 acres (1.2 to 8.5 ha) per territorial male in white spruce and paper birch habitat in Alaska (Ellison 1971)—these areas were used exclusively by males but were not necessarily defended.

HOME RANGE: May be as large as 100 ha (247 acres) for territorial males and 100 to 150 ha (247 to 370 acres) for hens that have nested (Ellison 1973).

SAMPLE DENSITIES: Possibly 10 males per square mile (4 males/km^2) in spruce-birch habitat in Alaska (Ellison 1971). 7 to 11 birds per 0.4 square mile (7 to 11 birds/km^2) (spring density); 20 to 36 birds per 0.4 square mile (20 to 36 birds/km^2) (autumn density) (Ellison 1973).

FORAGING: Major foods: Buds and needles of conifers (winter staple), insects, seeds, fruits and tender leaves of herbaceous plants, mushrooms. Substrates: Leaf litter of forest floor, high limbs of spruce (normally at least 15 to 20 feet (4.6 to 6.1 m)). Techniques: Scratching and pecking, budding.

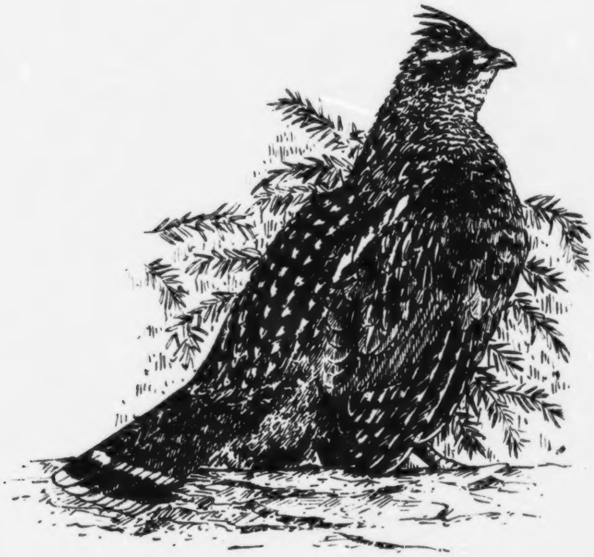
COMMENTS: Diet shifts in late summer and early autumn from nonconiferous materials to primarily coniferous ones.

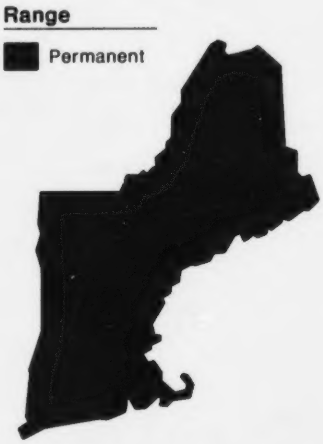
KEY REFERENCES: Bent 1932; Ellison 1971, 1973; Forbush and May 1939; Fritz 1977.

Ruffed Grouse

(Bonasa umbellus)

A.O.U. No. 300.0





RANGE: Breeding: Southern Quebec w. to Alaska, s. to Virginia and the mountains of n. Georgia. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Breeding: Broods prefer areas with dense woody cover overhead and fairly open herbaceous ground cover. Broods frequent regenerating stands of aspen, birch, and other hardwoods. Alder thickets, recently logged areas next to shrubby wetlands, and abandoned farmlands in the shrub and sapling stage are particularly attractive to broods. In extensive stands of pole and sawtimber, broods frequent logging roads, small clearings, and recently disturbed sites. Wintering: Daytime activity usually occurs in shrubby thickets and dense stands of hardwood saplings. Birds prefer to roost in snow burrows in open pole-size hardwood stands. When snow is unsuitable for roosting, birds concentrate in dense brush or closed-canopy conifer stands.

SPECIAL HABITAT REQUIREMENTS: Drumming logs in hardwood saplings, small poles, brushy escape cover, hardwood stands for nesting and feeding, sunny openings for dusting (Pough 1951:176). Strongly associated with the aspen type, especially in the Lake States (Gullion 1972), Grouse also occur in New England woodlands in which aspens exist only as scattered trees, or are absent. Old orchards are ideal fall habitat in New England.

NESTING: Egg dates: April 1 to June 22, New York (Bull 1974:206). Clutch size: 8 to 15, typically 9 to 12. Incubation period: About 24 days. Nestling period: Less than 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Usually on dry ground in dense cover in the shelter of a fallen log, rock, root, or low-hanging conifer limb near base of tree. Very often located at edge of a path or clearing and close to a source of water.

HOME RANGE: For males, the home range may be as small as 6 to 10 acres (2.4 to 4.0 ha) (Gullion 1972).

SAMPLE DENSITIES: Maximum density under optimum conditions seems to be about 1 pair per 6 to 8 acres (2.4 to 3.2 ha) (Gullion 1972).

FORAGING: Major foods: Seeds, insects, fruit, leaves; buds of birch, aspen, hazel, hophornbeam, and cherry are staples in fall and winter. Substrate: Leaf litter. Techniques: Scratching and pecking, browsing. Preferred feeding habitat: Aspen stands are favorite feeding spots in winter especially in the boreal forest zone (Svoboda and Gullion 1972).

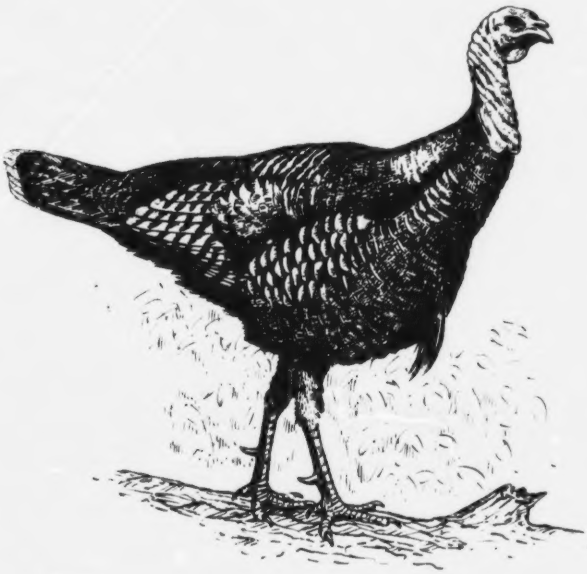
COMMENTS: Males are polygamous. In winter, birds may roost in small groups. In severely cold weather, grouse burrow-roost in snow if not crusted.

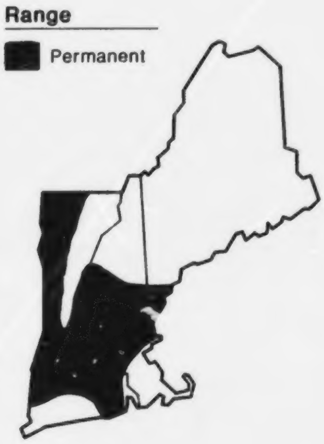
KEY REFERENCES: Bent 1932, Bump et al. 1947, Gullion 1972, Svoboda and Gullion 1972.

Wild Turkey

(Meleagris gallopavo)

A.O.U. No. 310.0





RANGE: Breeding: Resident in parts of Vermont, New Hampshire, Maine, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, Maryland, and West Virginia. Largest numbers occur in southern New York and southward in the Appalachian highlands through Pennsylvania and West Virginia. Range is expanding in New England where a population was recently reestablished via trapping and transplanting. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to rare.

HABITAT: Breeding: Forests, woodland clearings mostly in hilly or mountainous regions where food is available, open fields with trees nearby for roosting and cover. Ideal habitat is a network of open, mixed forests and fields. The conifers provide roosting sites, and the hardwoods provide feeding areas. Wintering: In woodlands, flocks prefer south slopes with mast producing hardwoods and abundant springs and seeps. In New England, turkeys readily use agricultural habitats such as cornfields, dairy farms, orchards, and pastures with abundant barberry or other fruiting shrubs.

SPECIAL HABITAT REQUIREMENTS: Mast-producing woodlands. Large conifers or hardwoods for roosting, open woodlands, abundant water (Schorger 1966:224-225).

NESTING: Egg dates: April 26 to July 9, New York (Bull 1974:212). Clutch size: 8 to 15, typically 10. Incubation period: 28 days. Nestling period: 1 day (precocial). Broods per year: 1, but hens renest if the first clutch is destroyed. Age at sexual maturity: Usually 1 year for females and 2 years for males. Nest site: Turkeys lay their eggs in a simple depression or dry ground, usually in dead leaves. Nests are usually under low, shrubby cover, near water, and next to a tree or stump. Hens exhibit no forest-type preference, but often nest in cut-over areas.

HOME RANGE: The annual range includes 4 or 5 square miles (1.5 to 1.9 km^2) (Pough 1951:190), but seasonal ranges are smaller and often distinct from one another. Home ranges are often restricted to 100 to 200 acres (40 to 80 ha) during the winter and nesting seasons. Large movements often occur in early spring, late summer, and fall.

SAMPLE DENSITIES: 7.7 birds per square mile (3 birds/km^2) on forested refuge land in West Virginia (Uhlig 1950). 15 to 20 birds per square mile (6 to 8 birds/km^2) under ideal conditions (Pough 1951:189).

FORAGING: Major foods: Acorns and beechnuts are staple foods; turkeys will eat the fruits and seeds of most trees and shrubs, also fruits, flowers, and leaves of herbaceous plants, tubers, roots, and insects. Substrates:

Wild Turkey (Continued)

(Meleagris gallopavo)

Leaf litter, plants. Techniques: Scratching and pecking, gleaning, grazing. Preferred feeding habitat: Mast-producing woodlands during fall and winter; fields, pastures, and woodlands with rich, herbaceous ground cover during summer.

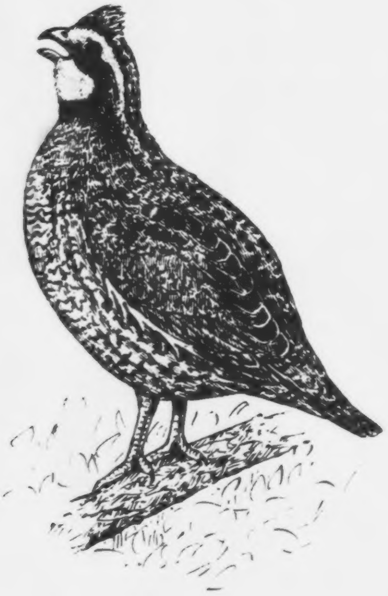
COMMENTS: A nomadic feeder—may visit feeding areas a half-mile or more apart. Males are polygamous. Elevation, topography, general location, and accessibility of forested areas may be more important to turkeys than forest types alone (Uhlig and Bailey 1952).

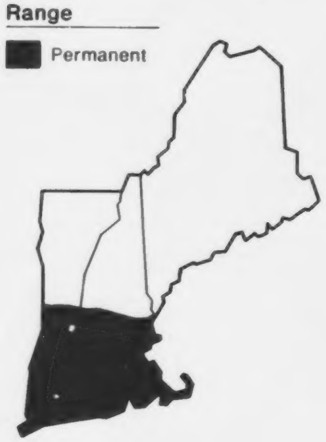
KEY REFERENCES: Bent 1932, Mosby and Handley 1943, Schorger 1966.

Northern Bobwhite

(Colinus virginianus)

A.O.U. No. 289.0





RANGE: Breeding: Southwestern Maine, w. to South Dakota, s. to the Gulf of Mexico. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon. Birds in s. New Hampshire and Maine probably are released stock.

HABITAT: Breeding: Open pastures, meadows with abundant weedy growth, open woodlands. Favors cultivated and fallow agricultural lands with hedgerows and dense brush for cover. Avoids deep woods. Wintering: Prefers areas with an edge of protective vegetative cover; pastures and brushy open woods, cultivated and fallow fields.

SPECIAL HABITAT REQUIREMENTS: Edges, well-drained sandy or loamy soils, woodland (10 to 90 percent) (Rosene 1969). Dense cover within 150 feet of feeding areas is essential in winter (Pough 1951:184).

NESTING: Egg dates: May 25 to September 24, New York (Bull 1974:203). Clutch size: 12 to 20, typically 14 to 16. Incubation period: 23 to 24 days. Nestling period: 1 or less days (precocial). Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest site. Usually among dead or growing grasses surrounded by patches of bare ground, often along fence rows or in neglected corners of pastures within 50 feet (15 m) of a clearing. Standing vegetation is usually less than 20 inches (0.5m) high and upright stems thin enough for birds to pass between (Rosene 1969:63).

TERRITORY SIZE: Approximately 1.1 acres (0.4 ha) in fallow field in Kansas (Fitch 1958). During several hundred observations, whistling males were seen no closer than 50 feet (15 m) (Rosene 1969:61).

HOME RANGE: Coveys generally remain within an area about 0.5 mile (0.8 km) in diameter (Stoddard 1931). Winter ranges are from 4 to 77 acres (1.6 to 31.2 ha) (averages 8.2 to 17.9 acres (3.3 to 7.2 ha)) on two plantations in South Carolina (Rosene 1969:88).

SAMPLE DENSITIES: Stockard (1905:149) found 16 nests in a 30-acre (12.1-ha) field of sedge in Mississippi. 5 pairs per 100 acres (40 ha) in field and edge habitat. 1.5 pairs per 100 acres (40 ha) in pine-deciduous forest and farmland in Maryland (Stewart and Robbins 1958:125).

FORAGING: Major foods: Soft herbaceous parts of plants, buds, seeds, fruits, insects. Substrates: Bare ground, litter layer of light movable material less than 2 inches (5 cm) thick. Techniques: Gleaning, scratching, pecking. Preferred feeding habitat: Cultivated fields and open areas near protective cover.

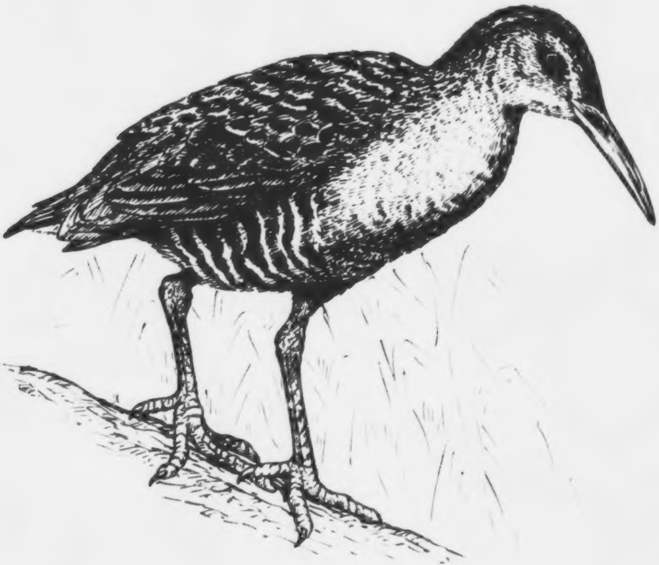
COMMENTS: Breeding pairs use wooded areas mainly for escape cover in summer but coveys of 6 to 25 individuals may remain in woods all winter if trees are scattered and canopy is open. Judd (1905 in Bent 1932:18) found that 917 stomachs contained 84 percent vegetable and 16 percent animal matter.

KEY REFERENCES: Bent 1932, Rosene 1969, Stoddard 1931.

King Rail

(Rallus elegans)

A.O.U. No. 208.0



Range
☐ Breeding

RANGE: Breeding: Southern New Hampshire and Vermont w. to s. Minnesota, s. to the Gulf Coast. Winter: Atlantic coast from New York.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Coastal and inland brackish to freshwater marshes with abundant vegetation (favors areas with sedges, bulrushes, and cattails), roadside ditches, and tidal rivers. Not known to breed in salt marshes. Wintering: Coastal brackish, salt, and fresh water marshes.

SPECIAL HABITAT REQUIREMENTS: Adequate vegetation for nesting and protection with fairly constant water levels throughout the breeding season (no deep flooding or drying).

NESTING: Egg dates: May 24 to July 3, New York (Bull 1974:218). Clutch size: 6 to 15, typically 10 or 11. Incubation period: 21 to 23 days. Nestling period: Less than 1 day (precocial). Broods per year: 1 (possibly 2 in southern states). Nest height: To 1.5 feet (0.5 m). Typically 0.5 to 1.5 feet (0.2 to 0.5 m). Nest site: Usually 6 to 18 inches (0.1 to 0.5 m) above water, often on a hummock among cattails, marsh grasses, rushes, or other aquatic vegetation, the stalks and leaves of which form a natural canopy. Water depth surrounding nest is usually less than 2 feet (0.6 m).

TERRITORY SIZE: Size not known. Male establishes and defends territory against King and other Rail species.

SAMPLE DENSITIES: 3 nests per 464 feet (141.5 m) of roadside ditch 30 feet (9.1 m) wide in Arkansas (Meanley 1969:49). 30 birds per 100 acres (40 ha) of inland fresh marsh in Florida (Bateman 1977).

FORAGING: Major foods: Aquatic and terrestrial insects, amphibians, crustaceans, mollusks, seeds of marsh plants, waste grain. Substrates: Marsh vegetation, very shallow water (2 or 3 inches deep (5.1 to 7.6 cm)), mudflats exposed by low tide. Techniques: Probing with bill, pecking, immersing head and neck, dabbling. Preferred feeding habitat: Feeds within breeding habitat but also ranges into nearby hay and grain fields.

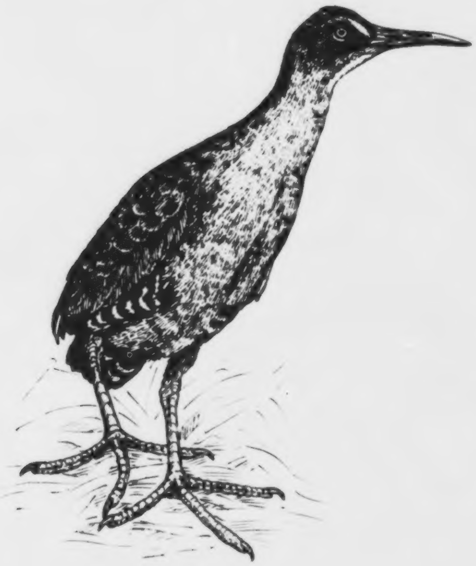
COMMENTS: Animal food component of 118 stomachs collected in Arkansas was 90 percent for spring and summer birds, 74 percent for fall birds, and 58 percent for winter birds (Meanley 1969). Wetland protection measures that prevent loss of habitat are important for maintaining the small populations of King Rails in the Northeast.

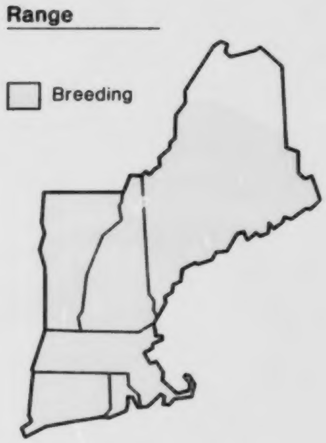
KEY REFERENCES: Bateman 1977, Blandin 1963, Meanley 1969.

Virginia Rail

(Rallus limicola)

A.O.U. No. 212.0





RANGE: Breeding: Nova Scotia and Quebec, s. to North Carolina, w. to California. Winter: Southern New Jersey, w. and s. Rarely n. to Massachusetts and New York.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon (Massachusetts) during the breeding season.

HABITAT: Breeding: Fresh water marshes with abundant vegetation such as sedges and cattails. Occasionally found in brackish and salt marshes. Widespread breeder at lower elevations. Wintering: Mainly in tidal marshes.

SPECIAL HABITAT REQUIREMENTS: Wetlands with sedge and cattail edge.

NESTING: Egg dates: May 5 to July 15, New York (Bull 1974:219). Clutch size: 6 to 13, typically 8 to 10. Incubation period: 19 days. Nestling period: Less than 1 day (precocial). Broods per year: 1 or 2. Nest height: To 1 foot (0.3 m), typically less than 1 foot (0.3 m). Nest site: Nest is usually 2 to 12 inches (5.1 to 30.5 cm) above water level in marsh vegetation. Usually well anchored to plant stalks and protected from above by leaves that form a canopy. Water depth near nest is typically 3 to 10 inches (7.6 to 25.4 cm).

TERRITORY SIZE: Does not seem to be territorial.

SAMPLE DENSITIES: 1 bird per acre (0.4 ha) in marsh in Colorado (Zimmerman 1977:50). 1.2 pairs per ha (2.5 acres) in marsh in New York (Post and Enders 1970). 5 pairs per 0.5 acre (1.2 ha) in Michigan (Berger 1951).

FORAGING: Major foods: Small fish, insects, seeds of marsh plants, berries, snails, crustaceans, worms. Substrates: Soft mud, tops and undersides of floating plants, pond debris. Techniques: Probing, gleaning. Preferred feeding habitat: Weed fields adjacent to breeding area.

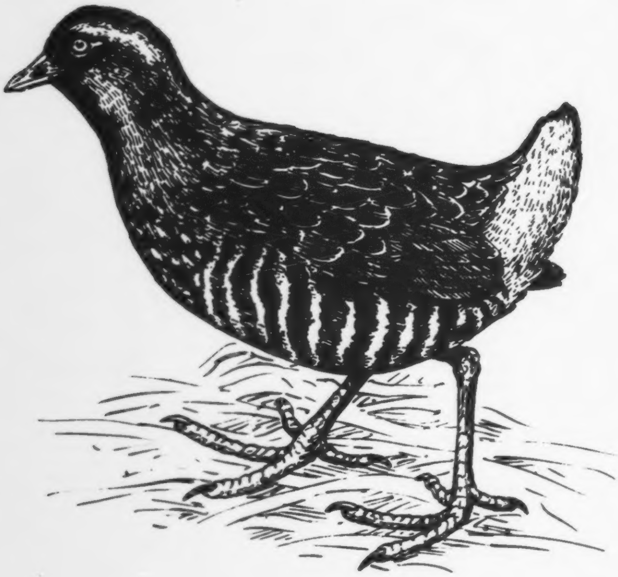
COMMENTS: Protection of existing wetlands is essential to the welfare of the Virginia Rail. Virginia Rails benefit from marsh management techniques employed for other game birds and mammals.

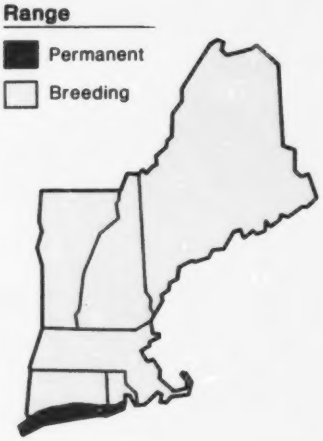
KEY REFERENCES: Berger 1951, Post and Enders 1970, Walkinshaw 1937, Zimmerman 1977.

Sora

(Porzana carolina)

A.O.U. No. 214.0





RANGE: Breeding: Nova Scotia and Quebec, w. to British Columbia and s. to Maryland and Ohio. Winter: Northern Florida and the Gulf Coast, s. Rarely n. to s. New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine).

HABITAT: Breeding: Marshes (favors fresh water), ponds, swamps, bogs, wet grassy meadows, sloughs having abundant and dense vegetation. Prefers sedges or cattails where mud and water are deep. Wintering: Tidal marshes.

NESTING: Egg dates: April 30 to July 17, New York (Bull 1974:220). Clutch size: 6 to 13, typically 10 to 12. Incubation period: 16 to 19 days (about 14 days (Odum 1977)). Nestling period: Less than 1 day (precocial). Broods per year: 1. Nest site: Nest is usually located on a platform of vegetation about 6 inches to more than 1 foot (15.2 to 30.5 + cm) above water level and is concealed from above by plants. Typically nests in the sedge zone of the marsh.

SAMPLE DENSITIES: Thought to be about 12 birds per acre (0.4 ha) at a reservoir in Colorado (Odum 1977). 35 nests per 107 acres (43.3 ha) in Iowa (Tanner and Hendrickson 1956). 4 pairs per 0.5 acre (0.2 ha) in cattail and sedge marsh in Michigan (Berger 1951).

FORAGING: Major foods: Aquatic and terrestrial insects (larvae and adults); cultivated grains and seeds (fall) especially those of sedge, wild rice, and bulrush; mollusks, crustaceans. Substrates: Shallow water, mud, marsh vegetation. Techniques: Probing, gleaning. Preferred feeding habitat: Wetlands, grain fields, dense seed-producing weeds.

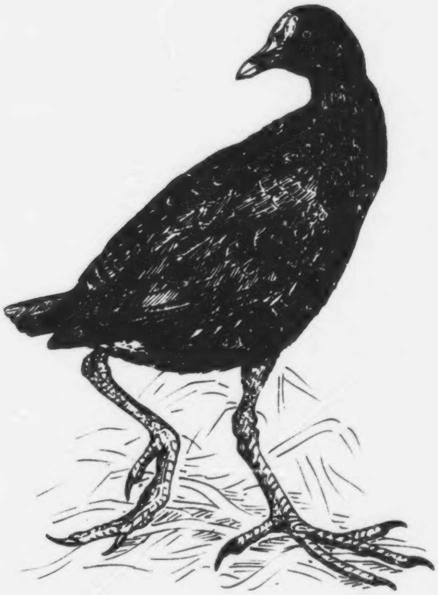
COMMENTS: Birds rely heavily on seeds in the fall, particularly in fresh water habitats. In brackish water areas, animals are the principal food items (Webster 1964). The Sora has been steadily decreasing in the Northeast since the turn of the century.

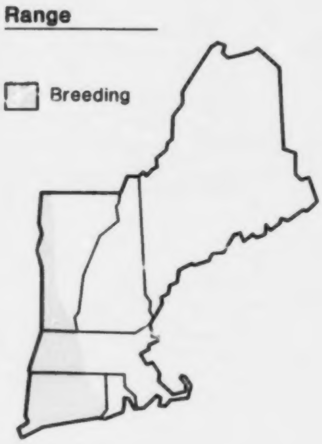
KEY REFERENCES: Bent 1926, Odum 1977, Tanner and Hendrickson 1956, Walkinshaw 1940, Webster 1964.

Common Moorhen

(Gallinula chloropus)

A.O.U. No. 219.0





RANGE: Breeding: Western New England and c. Maine, w. to Minnesota, s. to South America. Winter: South Carolina, w. to California, s. to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Freshwater marshes, ponds, lakes, canals, reservoirs, nearly any body of water with emergent vegetation growing in water 1 foot (0.5 m) deep or deeper (Pough 1951).

SPECIAL HABITAT REQUIREMENTS: Emergent vegetation growing in water 1 to 3 feet (0.5 to 0.9 m) deep (Krauth 1972 in Strohmeyer 1977). Requires some open water (Bull 1974:224).

NESTING: Egg dates: May 14 to July 25, New York (Bull 1974:224). Clutch size: 6 to 17, typically 10 to 12. Incubation period: 21 days. Nestling period: Probably less than 1 day (precocial). Broods per year: 1 or 2. Nest height: To 2 feet (0.6 m), typically less than 1 foot (0.3 m). Nest site: Typically nests on a hummock or other clump of emergent vegetation. Occasionally nests in shrubs such as willow or alder. Nest is usually over water 1 to 3 feet deep (0.3 to 0.9 m) and is well concealed by a canopy formed from surrounding taller plants.

FORAGING: Major foods: Vegetation leaves and stems of underwater plants, duckweed, leaves of grass and herbs, seeds and berries are staples. Animal foods include: snails, insects, and worms. Substrates: Water, surfaces of aquatic plants, mud. Techniques: Diving, dabbling, wading.

COMMENTS: Wetmore (1916) found 97 percent vegetable matter and 3 percent animal matter in 4 stomachs taken in May in Puerto Rico. Prefers the cattail zone of marshes (Allen 1939). Occurs in cattail-sedge marshes (Strohmeyer 1977) as well as *Phragmites* and *Sparganium*. Formerly Common Galinule.

KEY REFERENCES: Bent 1926, Fredrickson 1971, Strohmeyer 1977.

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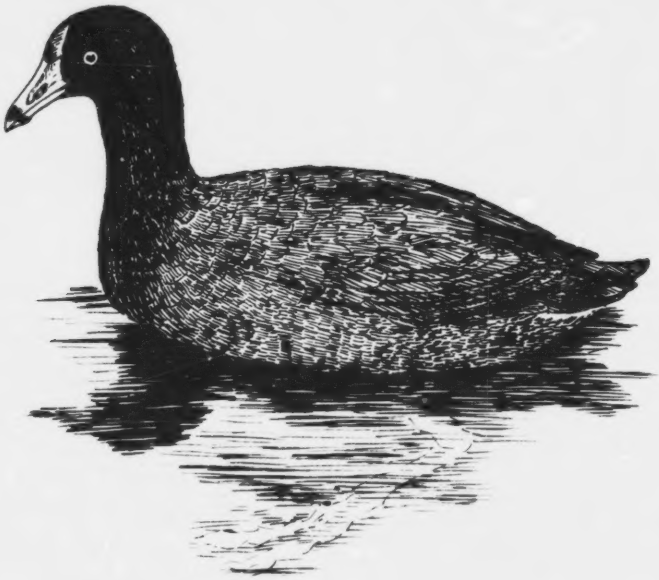
American Coot

(Fulica americana)

A.O.U. No. 221.0



Range
☐ Breeding

RANGE: Breeding: New Brunswick and s. Quebec, w. to British Columbia, s. to New Jersey, Ohio, Tennessee. Winter: Southern New Jersey, Maryland, s. Illinois, w. to Arizona, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare (Massachusetts) in breeding season. Uncommon to rare at coast in winter.

HABITAT: Breeding: Freshwater marshes, ponds, wet meadows, lakes, reservoirs, sewage lagoons, marshy borders of creeks and rivers with abundant emergent vegetation. Wintering: Ice-free fresh and brackish marshes along the coast.

SPECIAL HABITAT REQUIREMENTS: Shallow water 1 to 4 feet (0.3 to 1.2 m) deep with emergent vegetation.

NESTING: Egg dates: April 25 to July 14, New York (Bull 1974:224). Clutch size: 4 to 17, typically 9 or 10. Incubation period: 23 to 24 days. Nestling period: 1 to several days (precocial). Age at first flight: Probably 7 to 8 weeks. Age at sexual maturity: Probably 1 year. Nest site: Usually floating on surface of water 1 to 4 feet (0.3 to 1.2 m) deep and anchored to surrounding emergent vegetation (often cattails or bulrushes). Coots build platforms of vegetation for resting and brood rearing, and use muskrat houses for the same purposes.

TERRITORY SIZE: Average about 1 acre (0.4 ha) for 5 pairs in California (Gullion 1953). Coots are strongly territorial during the breeding season, defending nest against both coots and other marsh birds.

SAMPLE DENSITIES: 432 pairs per mile (166 pairs/km^2) under ideal conditions in the prairies of North Dakota (Stewart and Kantrud 1972). 1 nest per 0.54 acre (0.2 ha) in Iowa (Friley et al. 1938).

FORAGING: Major foods: Underwater plants are staples as well as algae, grass shoots, grains, aquatic insects; bulk of diet is vegetable matter but takes fish, tadpoles, worms, and crustaceans. Substrate: Shallow water. Techniques: Diving, grazing, dabbling. Preferred feeding habitat: In winter, coots often graze on lawns, golf courses, pastures, and cultivated fields.

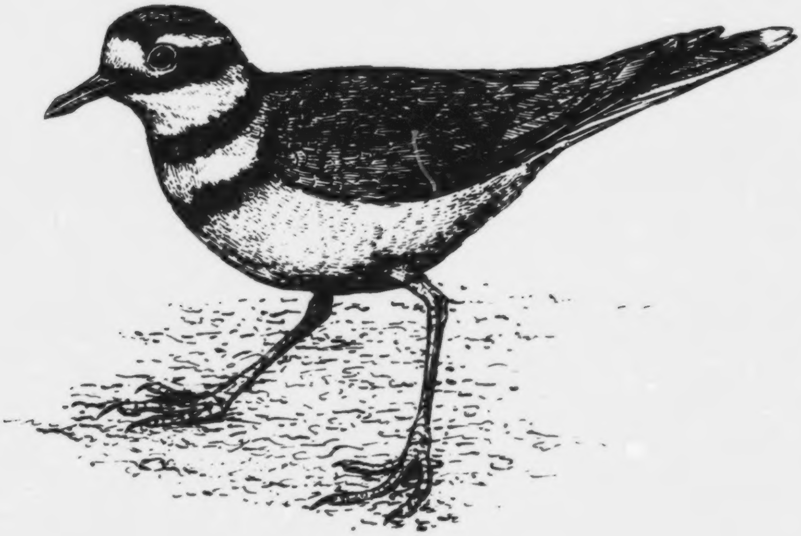
COMMENTS: Highest breeding densities of coots in Iowa were noted where 50 percent of marsh was open water and remaining 50 percent was emergent vegetation (Weller and Fredrickson 1973).

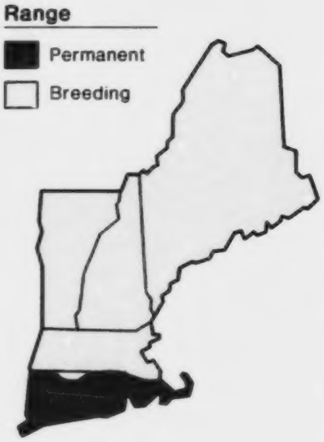
KEY REFERENCES: Bent 1926, Fredrickson 1970, Gullion 1953, Stewart and Kantrud 1972.

Killdeer

(Charadrius vociferus)

A.O.U. No. 273.0





RANGE: Breeding: Southern Canada, w. to British Columbia, s. to South America. Winter: Southern New England and New York, s. to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in breeding season. Common along coast in winter.

HABITAT: Breeding: Heavily grazed meadows, edges of pasture ponds, dry uplands. Often close to human habitation such as on lawns, golf courses, cemeteries, unpaved parking lots and driveways, airports, cultivated fields, waste places. Wintering: Plowed or sparsely vegetated moist fields. Coastal flats and beaches, river and lake shores that are free of ice.

SPECIAL HABITAT REQUIREMENTS: Open fields or waste areas with closely cropped or sparse vegetation.

NESTING: Egg dates: April 3 to July 4, New York (Bull 1974:239). Clutch size: 3 to 5, typically 4. Incubation period: 24 to 29 days. Nestling period: Less than 1 day (precocial). Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest site: Eggs are deposited on bare, often gravelly ground in a depression hollowed out by the female. Often a few small stones, wood chips, or other plant debris is placed inside. Pastures, meadows, and cultivated fields are favorite sites.

SAMPLE DENSITIES: 24 pairs per square mile (9 birds/km^2) maximum density) in North Dakota (Stewart and Kantrud 1972). 3.9 pairs per 100 acres (40 ha) in plowed field and wheat field in Maryland (Stewart and Robbins 1958:136).

FORAGING: Major foods: Insects—especially beetles and grasshoppers; centipedes, spiders, worms, snails, crayfish, weed seeds. Substrates: Bare soil, short grasses. Techniques: Robin-like running and pausing, gleaning.

COMMENTS: Killdeer are solitary feeders. They spread out over an area rather than feed in compact groups like sandpipers. Habitat trends: increasing in Maine, Ohio; decreasing in Massachusetts, New Hampshire, Rhode Island; static in Connecticut, Delaware, and Vermont; unknown in New Jersey (Jurek and Leach 1977).

KEY REFERENCES: Bent 1929, Nickell 1943, Pough 1951.

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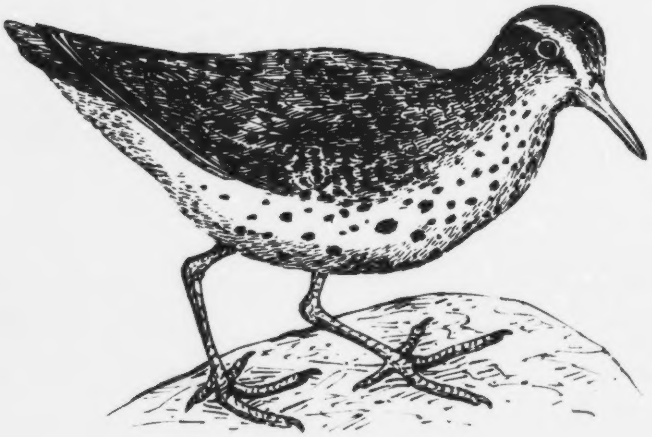
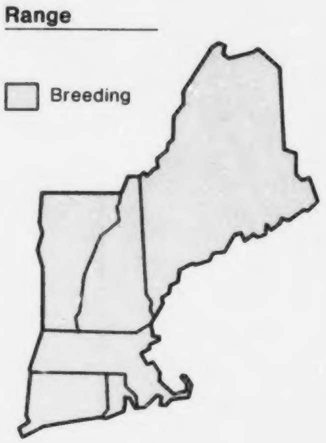
Spotted Sandpiper

(Actitis macularia)

A.O.U. No. 263.0





RANGE: Breeding: Newfoundland, Quebec w. to Mackenzie District, Northwest Territory, and Alaska, s. to South Carolina, Texas, and New Mexico. Winter: South Carolina, the Gulf States, s. to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon and widespread.

HABITAT: Breeding: Breeds in vicinity of fresh water often along edges of ponds, lakes, rivers or far from water in dry fields, pastures, and weedy shoulders of roads. Also uses coastal beaches and dunes. Prefers open terrain.

NESTING: Egg dates: May 6 to July 26, New York (Bull 1974:251). Clutch size: 3 to 5, typically 4. Incubation period: 20 to 24 days. Nestling period: Less than 1 day (precocial). Age at first flight: 15 to 16 days. Age at sexual maturity: 1 year. Nest site: Nests are solitary or in loose colonies. Eggs are laid in a depression in the ground that is lined with grass. Often under shrubs or weeds or in tall grass up to 30 inches high (76.2 cm).

TERRITORY SIZE: Little or no defended area.

SAMPLE DENSITIES: 43 pairs per 17.6 acres (7.1 ha) of dry meadow-rocky shore-sandy beach habitat in Michigan (Miller and Miller 1948).

FORAGING: Major foods: Insects, especially grasshoppers and crickets, small fish (occasionally), and crustaceans. Substrates: Mud, wet and dry sand, short grasses. Techniques: Walking slowly and gleaning, occasionally catching insects on the wing, swimming and diving.

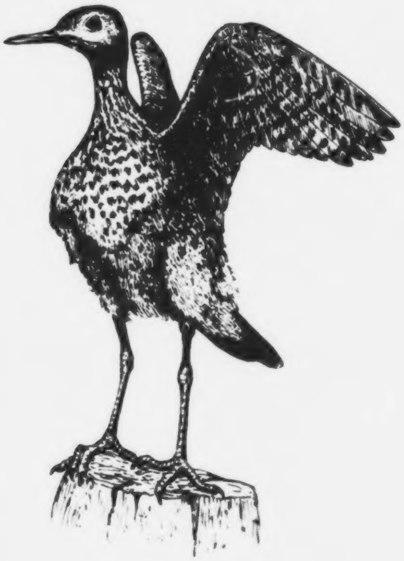
COMMENTS: Pair bond is both monogamous and polygamous. Females often polyandrous (Hays 1972). Spotted Sandpiper numbers are static throughout most of the Northeast but seem to be decreasing in Massachusetts (Jurek and Leach 1977).

KEY REFERENCES: Bent 1929, Hays 1972, Miller and Miller 1948.

Upland Sandpiper

(Bartramia longicauda)

A.O.U. No. 261.0



Range
☐ Breeding

RANGE: Breeding: Central Maine (few), w. to Alaska, s. to Virginia, Illinois, Oklahoma. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (Maine) to rare (Massachusetts, Vermont).

HABITAT: Breeding: Wide open pastures or grassy fields, often hayfields of alfalfa or clover; occasionally opening in forest.

NESTING: Egg dates: April 23 to June 15, New York (Bull 1974:254). Clutch size: 4 to 5, typically 4. Incubation period: 21 to 24 days. Nestling period: Less than 1 day (precocial). Age at first flight: About 30 to 31 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Well hidden in a depression in grass covered by nearby vegetation. Usually nests in loosely spaced colonies.

TERRITORY SIZE: Two pairs had territories of 20 to 30 acres (8.1 to 12.1 ha) each in grassland in Wisconsin (Wiens 1969:41).

HOME RANGE: For a nesting male and female, the mean distance travelled from nest was 241 m (263.6 yards) and 869 m (950.3 yards), respectively. The female home range was 8 ha (19.8 acres), the male home range was 86 ha (212.4 acres) (Ailes and Toepfer 1977).

SAMPLE DENSITIES: 1 nest per 1.5 to 15 acres (0.6 to 6.1 ha) (Harrison 1975:70). 20 pairs per square mile (8 pairs/km^2) (maximum density) in North Dakota (Stewart and Kantrud 1972). 7 nests were found in a 17-acre (6.9 ha) timothy field (Buss and Hawkins 1939).

FORAGING: Major foods: Insects — especially grasshoppers and crickets, waste grains and seeds of grasses and weeds. Animal 97 percent, vegetable 3 percent (McAtee 1912 in Bent 1929). Substrate: Grasses. Techniques: Robin-like alternate running and pausing.

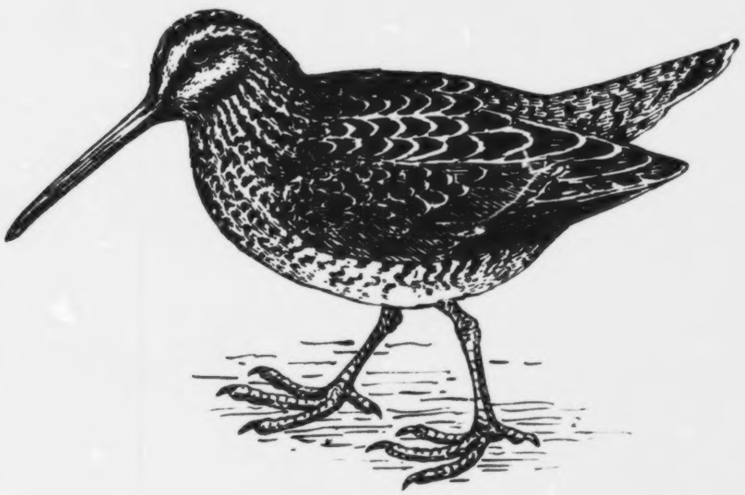
COMMENTS: Logging and small-scale farming have created good habitat for the Upland Sandpiper in the Northeast, enabling the bird to expand its range. Hayfields and old pastures are favored nesting habitat in New York State (Bull 1974:254). Extensive plowing and cultivating has destroyed much habitat in the prairies of the Midwest. Birds are decreasing in New Hampshire and Massachusetts where they are rare, and in Maryland, where uncommon (Jurek and Leach 1977).

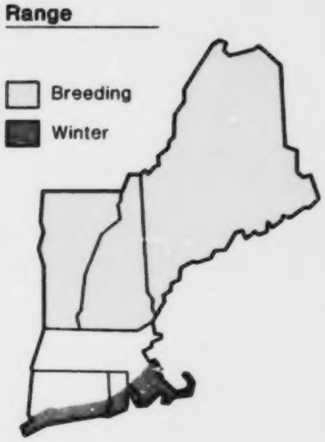
KEY REFERENCES: Bent 1929, Buss and Hawkins 1939.

Common Snipe

(Gallinago gallinago)

A.O.U. No. 230.0





RANGE: Breeding: Most of Canada, s. to n. New England, Pennsylvania, and n. New Jersey. Winter: Coastal New England to Virginia and inland to California, s. to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (c. and w. Maine) to uncommon (Vermont) in breeding season.

HABITAT: Breeding: Marshes with short vegetation, sedge bogs, alder and willow swamps, pond margins and lowlands associated with brooks and rivers where soils are mucky and the vegetation is sparse, wet meadows. Wintering: Near coast at small open creeks, springs and streams, marshes, fallow fields, cow pastures.

SPECIAL HABITAT REQUIREMENTS: Moist organic soils. Low scanty vegetation for nest and brood cover. Bogs, swamps. Large open spaces for courtship activities.

NESTING: Egg dates: April 20 to June 16, New York (Bull 1974:242). Clutch size: 3 to 5, typically 4. Incubation period: 18 to 20 days. Nestling period: Less than 1 day (precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Nest is concealed among grasses or other vegetation on dry ground, sometimes on a tussock of grass or sedge.

TERRITORY SIZE: Unknown. Male selects and defends an area against other snipes. Size decreases as incubation advances. Defense ceases after chicks hatch.

SAMPLE DENSITIES: Breeding: Up to 17 pairs per 100 ha (247 acres) on peatland in Newfoundland (Tuck 1972). Spring: 11.6 birds per 100 acres (40 ha) in Oregon (Fogarty and Arnold 1977). Winter: 275 birds per 100 acres (40 ha) in Florida (Fogarty and Arnold 1977).

FORAGING: Major foods: Larvae of aquatic insects (about 50 percent of diet), earthworms (staple), snails, small crustaceans, seeds of marsh plants. Substrates: Mud, shallow water, dry and wet grasses, surfaces of marsh plants. Techniques: Probing, gleaning. Preferred feeding habitat: Winter-marshes where taller vegetation dies back exposing bare mud.

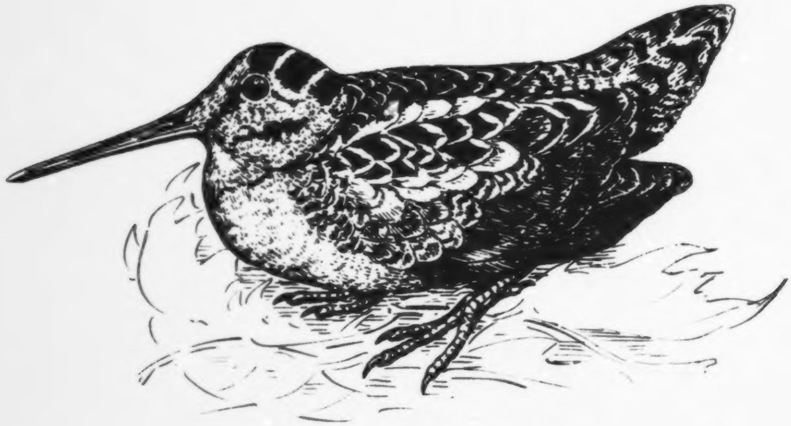
COMMENTS: Males and females are promiscuous. Erickson (1941) found that animal matter accounted for 61.5 percent of the contents of 76 stomachs. White and Harris (1966) and Sperry (1940) found animal matter in more than 80 percent of the diet.

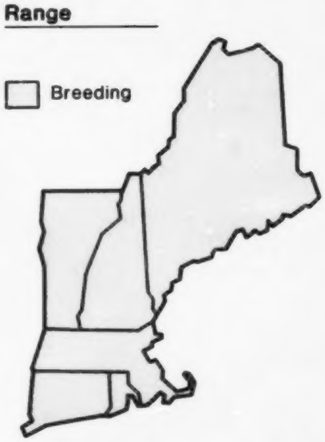
KEY REFERENCES: Bent 1927, Erickson 1941, Fogarty and Arnold 1977, Tuck 1972, White and Harris 1966.

American Woodcock

(Scolopax minor)

A.O.U. No. 228.0





RANGE: Breeding: Southern Newfoundland, s. Quebec, w. to se. Manitoba, s. to Florida and Texas. Winter: Southern New Jersey and the Ohio Valley, s. to c. Florida and se. Texas.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon. Rare in winter along coast.

HABITAT: Breeding: Moist woodlands in early stages of succession, swamps, stream banks, bogs, rich bottomlands, often in thickets of alder, willow or maple, brushy edges of woods, dry open woods and fields. Wintering: Concentrate along rivers and streams.

SPECIAL HABITAT REQUIREMENTS: Fertile, moist soil that contains earthworms. Fields or small forest openings for courtship activities and nocturnal roosting. Dense brushy swales for diurnal cover.

NESTING: Egg dates: March 24 to June 17, New York (Bull 1974:240). Clutch size: 3 to 5, typically 4. Incubation period: 20 to 21 days. Nestling period: Several days (precocial). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: On forest floor or abandoned field in slight depression lined with a few dead leaves. Usually located within 50 yards (45.7 m) of an edge. Hidden in a variety of cover from grasses to young or middle-aged hardwoods of light to medium density (Owen 1977).

TERRITORY SIZE: Females do not defend nests. The singing ground of the male may range in size from about 0.25 acre (0.1 ha) to more than 100 acres (40 ha) (Owen 1977).

SAMPLE DENSITIES: 4 to 7 males per mile (1.6 km) in New Hampshire and Maine singing ground surveys in 1971 and 1972 (Owen 1977). 5.6 territorial males per 100 acres (40 ha) in brushy abandoned farmland in Maryland. 1.5 territorial males per 100 acres (40 ha) in cut and burned woodland in Maryland (Stewart and Robbins 1958:139).

FORAGING: Major foods: Earthworms accounted for 50 to 90 percent of diet (Sperry 1940). Larvae of beetles, flies and other insects form the balance. Leaves, seeds, and fruits are occasionally taken. Substrates: Soft earth, mud, leaf litter, dry grasses. Techniques: Probing, gleaning. Preferred feeding habitat: Open pastures, cultivated fields, stream banks.

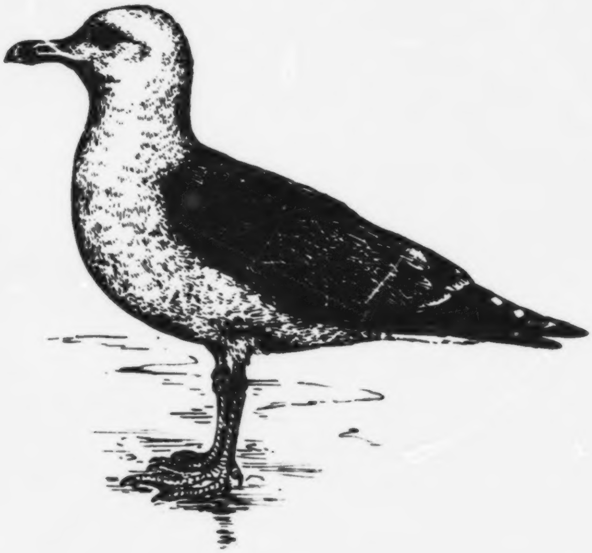
COMMENTS: Males typically have polygynous mating habits. Courtship takes place only where there are scattered woody plants 1 to 2 feet (0.3 to 0.6 m) high, in early succession (Sheldon 1967:64). Estimated carrying capacity under best breeding conditions is about 1 pair per 5.5 to 6.0 acres (2.2 to 2.4 ha) (Mendall and Aldous 1943).

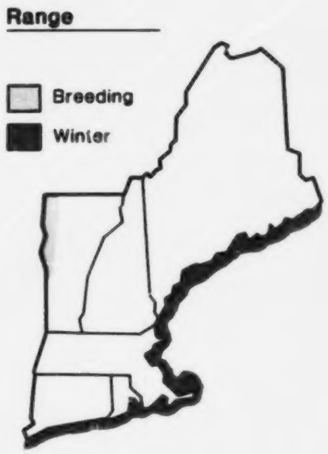
KEY REFERENCES: Bent 1927, 1929, Mendall and Aldous 1943, Owen 1977, Sheldon 1967.

Ring-billed Gull

(Larus delawarensis)

A.O.U. No. 054.0





RANGE: Breeding: Alaska and Labrador s. to the Great Lakes and California. Winter: Atlantic coast from Nova Scotia to Gulf of Mexico and Mississippi River and major tributaries.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common locally.

HABITAT: Breeding: Lakes and rivers, open beaches, mudflats and harbors. Wintering: near salt water.

NESTING: Egg dates: June 20 to 30, Labrador (Bent 1921). Clutch size: 2 to 4 usually 3. Incubation period: 21 days. Broods per year: 1. Nest height: On the ground, occasionally in low trees. Nest site: Often on lake islands.

FORAGING: Major foods: insects, worms, grubs, and sometimes bird eggs and mice; they also scavenge.

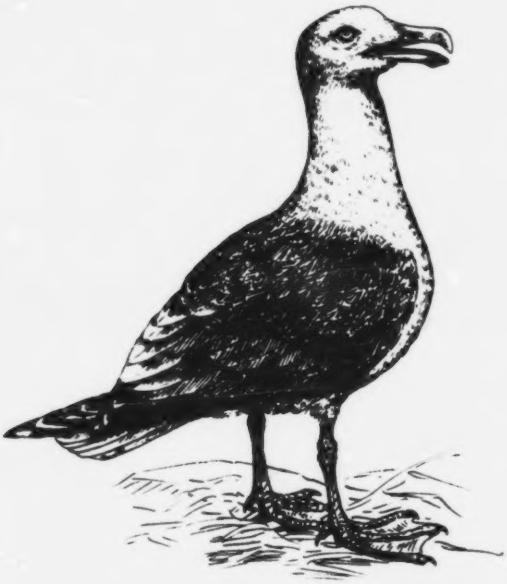
TERRITORY SIZE: Colonial nester 85,000 pairs nest on an island in Lake Ontario (Bull and Farrand 1977:447).

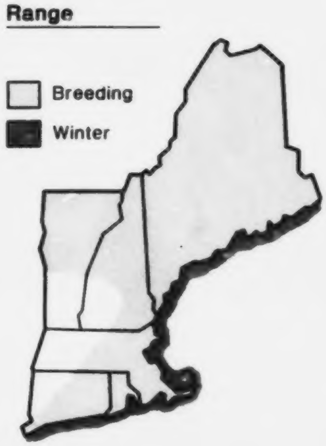
KEY REFERENCES: Bent 1921, Burleigh 1958.

Herring Gull

(Larus argentatus)

A.O.U. No. 051.0





RANGE: Breeding: Northern North American and along the Atlantic coast as far s. as North Carolina. Winter: Along the Atlantic and Gulf Coasts.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Mainly on islands in lakes, rivers, and estuaries, also on coastal beaches. Wintering: same as breeding habitat except where bodies of water freeze over.

NESTING: Egg dates: May 4 to August 8. Clutch size: 2 to 4, typically 3. Incubation period: 25 to 28 days. Broods per year: 1. Nest site: On the ground, also on cliff ledges, and occasionally in trees.

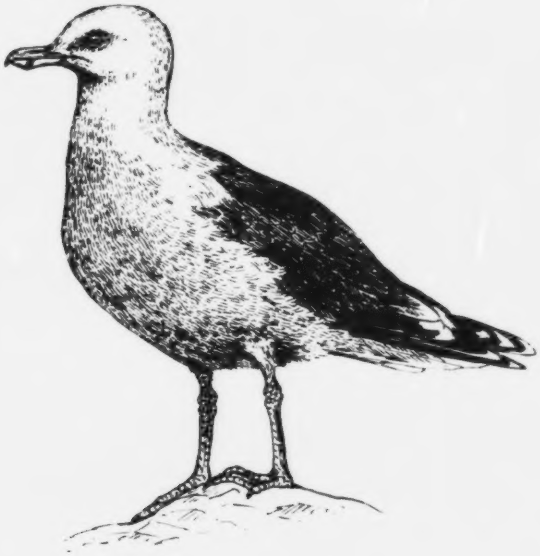
FORAGING: Major foods: Fish and shell fish, offal from fishing boats and fish processing plants. They also scavenge along shorelines and at garbage dumps. Substrates: Surface and shoreline of bodies of water, landfills.

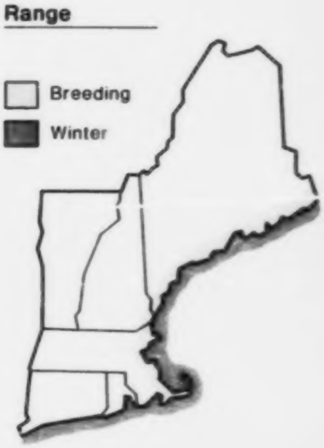
COMMENTS: In recent years it has become abundant, probably due to the amount of food available at garbage dumps, and has extended its range southward along the Atlantic Coast, often to the detriment of colonial birds such as Terns and Laughing Gulls (Bull and Farrand 1977:445).

Great Black-backed Gull

(Larus marinus)

A.O.U. No. 047.0





RANGE: Breeding: From Labrador to New York along the North American East coast. Winter: As far s. as North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Cliffs and on islands in freshwater lakes. Wintering: Usually rivers and freshwater lakes near the coast and coastal islands.

NESTING: Egg dates: May through June. Clutch size: 3, sometimes 2. Incubation period: 27 days. Nestling period: 42 to 56 days. Broods per year: 1. Nest height: On the ground on coastal islands or on cliff ledges.

TERRITORY SIZE: Nests may be solitary or in colonies of various sizes.

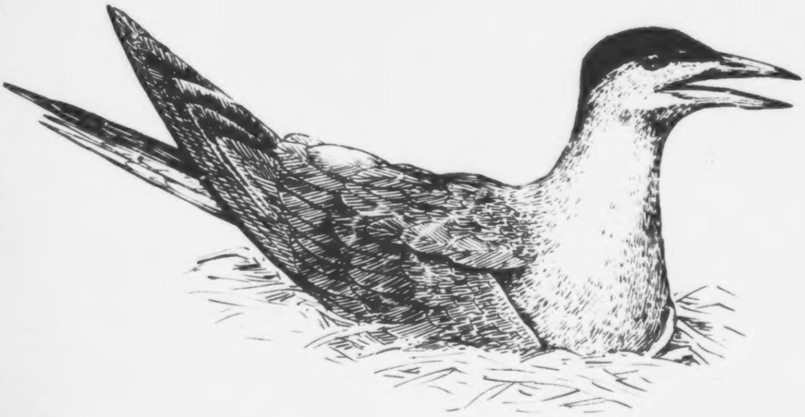
FORAGING: Major foods: Eggs and young of seabirds, carrion, and garbage from human dumps.

KEY REFERENCES: Godfrey 1979.

Common Tern

(Sterna hirundo)

A.O.U. No. 070.0



Range
☐ Breeding

RANGE: Breeding: Alberta s. to Wisconsin and e. to Labrador; s. generally along the coast to Louisiana. Winter: South Carolina s. to the Straits of Magellan.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant locally.

HABITAT: Breeding: Gravelly and sandy beaches, grassy uplands, on rocky shores of islands (Harrison 1975:80). Winter: Coasts from southern limit of breeding range (on Atlantic coast to South Carolina).

NESTING: Egg dates: May through July. Clutch size: 2 or 4, usually 3. Incubation period: 24 to 26 days. Nestling period: 3 to 4 days. Broods per year: 1. Nest site: Often a slight hollow in sand, shells, or pebbles (Harrison 1975:80).

TERRITORY SIZE: Nest in loose colonies.

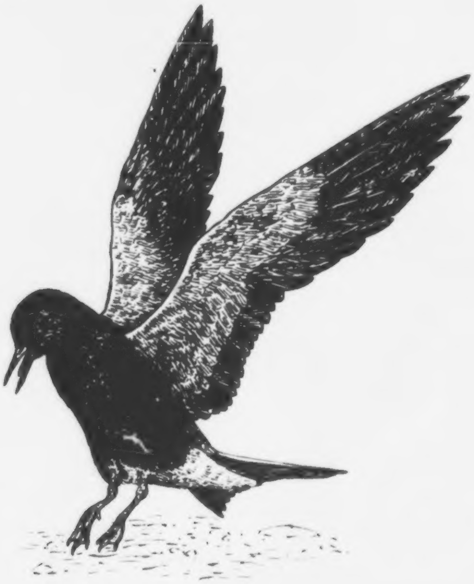
FORAGING: Major foods: Small fish. Substrates: Water surface. Techniques: Diving from air to water surface.

KEY REFERENCES: Godfrey 1979, Harrison 1975.

Black Tern

(Chlidonias niger)

A.O.U. No. 077.0



Range
☐ Breeding

RANGE: Breeding: Southern Canada s. to Pennsylvania, into w. New York and Maine. Winter: Generally s. of the United States.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Coastal and inland marshes, wet meadows.

NESTING: Egg dates: May through July. Clutch size: 3. Incubation period: 21 to 24 days. Nestling period: 2 to 3 days. Broods per year: 1. Nest site: Often on islands of rotting, floating vegetation. Eggs are often wet (Harrison 1975:78).

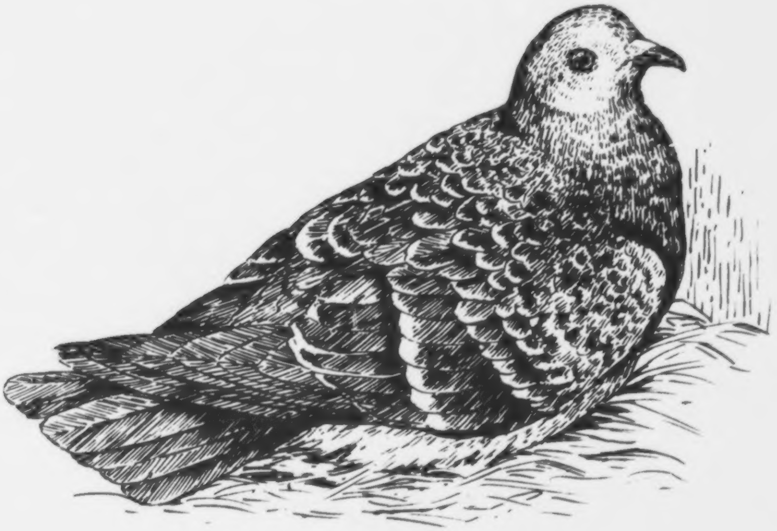
FORAGING: Major foods: Insects, fish, and small crustaceans. Substrates: Over grasses and water. Techniques: Hawking.

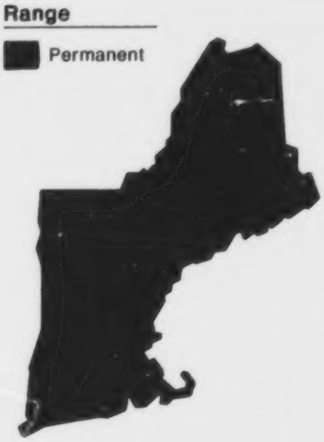
KEY REFERENCES: Burleigh 1958, Harrison 1975.

Rock Dove

(Columba livia)

A.O.U. No. 313.1





RANGE: Breeding: Throughtout temperate North America. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Breeding: Feral birds are found in open country, sometimes near cliffs and ledges that have roosting sites but are more common near human habitations, especially cities and farms. Wintering: Same as breeding habitat.

NESTING: Egg dates: Throughout the year (Bull 1974:316). Clutch size: 1 to 2, typically 2. Incubation period: 17 to 19 days. Nestling period: 21 to 28 days. Brood per year: 2 or 3. Age at sexual maturity: 1 year. Nest site: Usually on or in buildings or bridges or other man-made structures in semi-dark cavities. Rock Doves nest singly or in colonies.

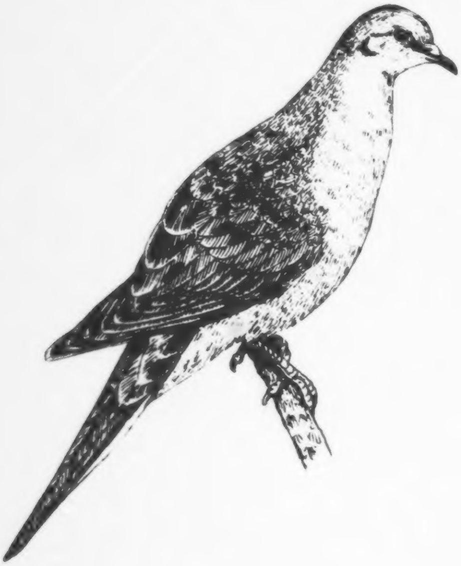
FORAGING: Major foods: Seeds of weeds and grasses, grains, bread crumbs, and other human handouts. Substrates: Pavement, sparsely vegetated ground. Techniques: Gleaning. Preferred feeding habitat: Sidewalks and parking lots in cities, city parks, cultivated fields, wastelands.

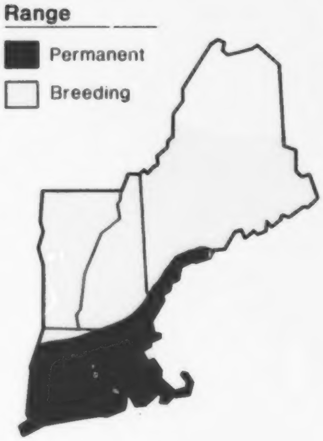
COMMENTS: Rock Doves prefer to roost in groups in areas that are sunny and sheltered from winds. Believed to mate for life.

KEY REFERENCES: Forbush 1929, Goodwin 1977.

Mourning Dove
(Zenaida macroura)

A.O.U. No. 316.0





RANGE: Breeding: Central Maine, New Hampshire, Vermont and New York, w. to British Columbia, s. to the Bahamas and Mexico. Winter: Southern Maine, New Hampshire and Vermont, w. to Oregon, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Open mixed woodlands and woodland edges, evergreen plantations, orchards and farmlands, suburbs, cities. Avoids dense forests and high elevations (mountains). Birds nest most frequently in agricultural and residential areas. Wintering: Similar to breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Open land with bare ground that produces adequate food (seeds).

NESTING: Egg dates: March 9 to September 28, New York (Bull 1974:320). Clutch size: 1 to 3, typically 2. Incubation period: 13 to 14 days. Nestling period: 12 to 14 days. Broods per year: 2 or more (as many as 6 clutches per season in temperate areas (Keeler 1977)). Age at sexual maturity: 1 year. Nest height: to 50 feet (15.2 m), typically 10 to 25 feet (3.0 to 7.6 m). Nest site: Often in a coniferous tree. Also in tangles of shrubs or vines. Occasionally uses old nest of other bird to support its twig platform. Nest is typically placed on a horizontal limb. Solitary or loosely colonial. DeGraaf (1975:29) found coniferous vegetation 0 to 35 feet (10.7 m) high important to Mourning Dove occurrence.

SAMPLE DENSITIES: Relative densities of breeding Mourning Doves based on the mean number heard per 20-mile (32 km) survey route: 0 to 9.9 birds—Maine, New Hampshire, Vermont, w. Pennsylvania, e. Ohio, West Virginia (Keeler 1977); 10.0 to 29.9 birds—Massachusetts, Rhode Island, Connecticut, New Jersey, e. Pennsylvania, Maryland (Keeler 1977); 30.0 to 59.9 birds—w. Ohio (Keeler 1977). 76 pairs per square mile (29 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: Weed seeds and waste grain of agriculture, occasionally takes small snails. Substrates: Open, bare ground; short grasses. Techniques: Walking and ground gleaning. Preferred feeding habitat: Cultivated fields.

COMMENTS: Pair bond is usually life-long monogamy. Birds generally increase their range and numbers in areas with secondary growth, cultivated fields and pastures (Goodwin 1977:206).

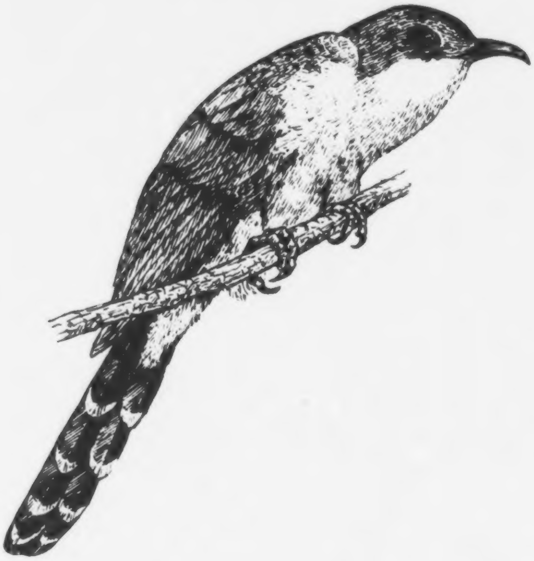
KEY REFERENCES: Goodwin 1977, Hanson and Kossack 1962, Keeler 1977, Lehner 1965.

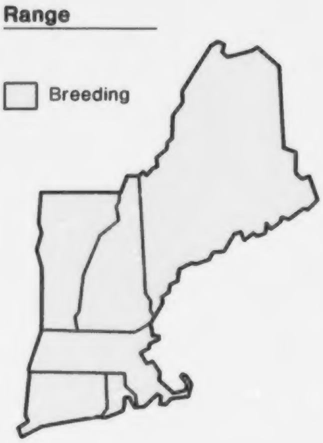
BEST COPY AVAILABLE

Black-billed Cuckoo

(Coccyzus erythropthalmus)

A.O.U. No. 388.0





RANGE: Breeding: Prince Edward Island, w. to se. Alberta, s. to South Carolina. Winter: nw. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Brushy pastures, shrubby hedgerows at edges of fields, dry, open upland woods and groves.

SPECIAL HABITAT REQUIREMENTS: Low, dense, shrubby vegetation.

NESTING: Egg dates: May 20 to August 28, New York (Bull 1974:325). Clutch size: 2 to 5, typically 2 to 4. Incubation period: 14 days. Nestling period: 7 to 9 days (young perch on branches, unable to fly). Age at first flight: Unknown. Age at sexual maturity: 1 year. Nest height: 2 to 20 feet (0.6 to 6.1 m), typically 4 to 6 feet (1.2 to 1.8 m). Nest site: Usually low in shrub or on branch of deciduous or coniferous tree, well concealed among the leaves.

FORAGING: Major foods: Caterpillars (staple); also eats beetles, grasshoppers, crickets, and other insects; is fond of fleshy fruits. Substrates: Upper and lower leaf surfaces. Technique: Leaf gleaning.

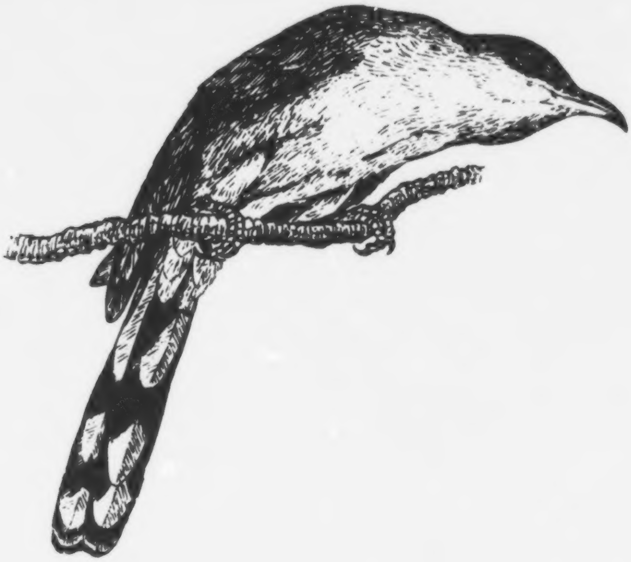
COMMENTS: The feeding habits of the Yellow-billed and Black-billed Cuckoos appear to be similar. Black-billed Cuckoos seem to use extensive woodlands more than Yellow-billed Cuckoos do (Pough 1949:5).

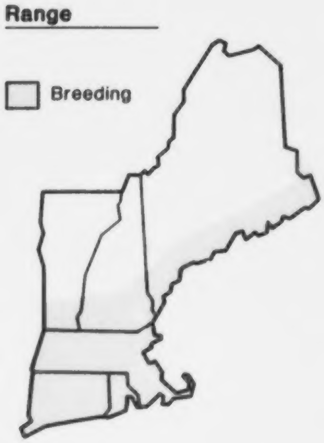
KEY REFERENCES: Bent 1940, Miller 1934, Spencer 1943.

Yellow-billed Cuckoo

(Coccyzus americanus)

A.O.U. No. 387.0





RANGE: Breeding: New Brunswick, w. to British Columbia, s. to the Florida Keys, Gulf Coast, and Mexico. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Open woods, overgrown weedy fields, roadsides, abandoned orchards, streambanks with dense thickets, brushy pastures with small trees and vines. Seldom seen at high elevations.

SPECIAL HABITAT REQUIREMENTS: Low, dense, shrubby vegetation.

NESTING: Egg dates: May 26 to August 19, New York (Bull 1974:324). Clutch size: 1 to 5, typically 3 or 4. Incubation period: About 14 days. Nestling period: 7 to 9 days (young perch on branches, unable to fly). Age at first flight: Unknown. Broods per year: Probably 1. Age at sexual maturity: 1 year. Nest height: 2 to 20 feet (0.6 to 6.1 m), typically 4 to 10 feet (1.2 to 3.0 m). Nest site: Prefers to nest in thick bushes overgrown with grape vines or in trees on horizontal limbs. Nest is usually well concealed by surrounding foliage.

SAMPLE DENSITIES: 8 territorial males per 100 acres (40 ha) in upland oak forest in Maryland. 6 territorial males per 100 acres (40 ha) in floodplain forest in Maryland. 4 territorial males per 100 acres (40 ha) in hedgerows, active and abandoned farmland in Maryland (Stewart and Robbins 1958:177).

FORAGING: Major foods: Caterpillars (staple) and other insects; many kinds of fruits such as grapes, mulberries and elderberries. Substrates: Upper and lower leaf surfaces. Technique: Leaf gleaning.

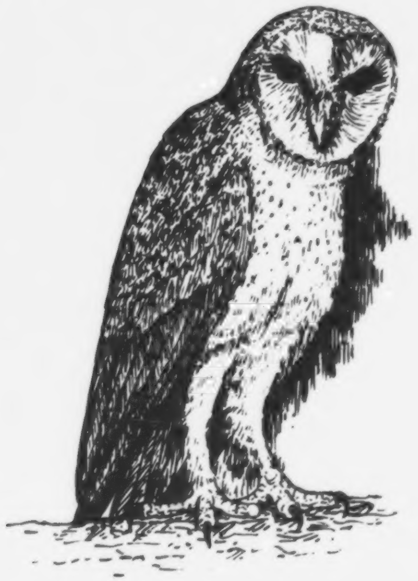
COMMENTS: Frequently consumes larvae of gypsy moth, tent caterpillar, and fall webworm. Parasitism is not a common practice as it is in the European Cuckoo.

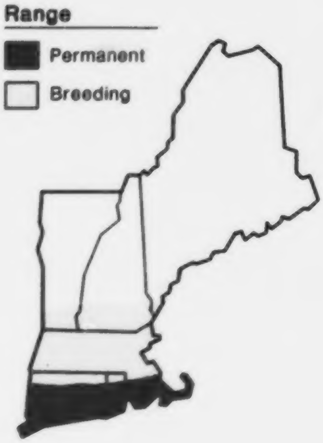
KEY REFERENCES: Bent 1940, Preble 1957.

Common Barn-Owl

(Tyto alba)

A.O.U. No. 365.0





RANGE: Breeding: Mainly coastal s. New England, w. to British Columbia, s. Winter: Same as breeding range except that many of the northern birds migrate s. for the winter.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and local breeder (Vermont, Massachusetts). Rare in winter.

HABITAT: Breeding: Almost anywhere in open country but prefers vicinity of farms and villages. Avoids woodlands and higher elevations. Wintering: Same as breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Abundant supply of rodents for food. Barns, silos, deserted buildings, cavities or covered duck blinds for nesting.

NESTING: Egg dates: February to December. Peak: April to June, New York (Bull 1974:328). Clutch size: 3 to 11, typically 5 to 7. Incubation period: 32 to 34 days (Harrison 1975). Nestling period: 50 to 60 days. Broods per year: 1 or 2. Double-brooded in s. New York (Bull 1974:328). Age at sexual maturity: 1 year. Nest site: Barns, abandoned buildings, silos, tree cavities, church steeples, and artificial nest sites such as bird houses, baskets, and barrels. Also nests in burrows in cliffs or banks.

FORAGING: Major foods: Rodents (especially mice) are staples; also takes other small mammals and occasionally takes small birds. Substrates: Meadow grasses. Techniques: Diving and grasping, quartering low (a few meters above ground). Preferred feeding habitat: Marshes, meadows, fields, barnyards, brushy areas, garbage dumps that attract rodents.

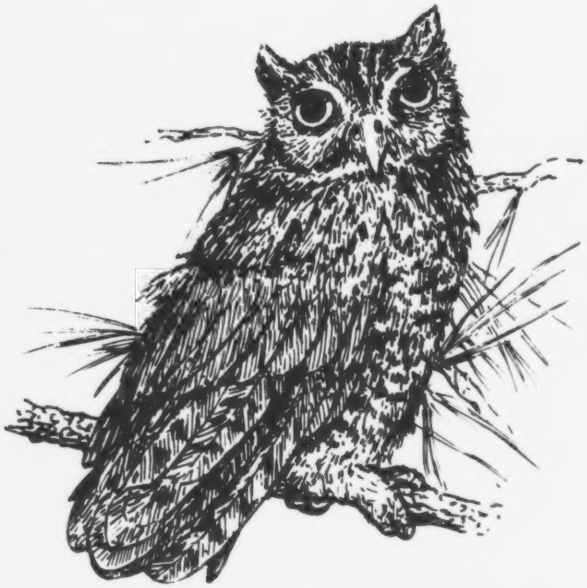
COMMENTS: Birds are nocturnal, roosting by day and hunting by night, hence, they are seldom observed even in thickly settled towns and cities. Barn-Owls have been observed roosting in cedar groves (Georgia) and pine plantations (Michigan). Breeding is irregular, depending on availability of food. Wallace (1948) in Michigan found that 80 to 90 percent of diet consisted of meadow mice *(Microtus)*.

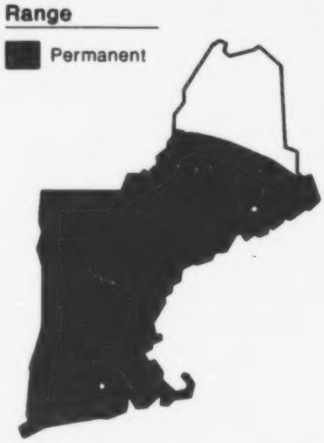
KEY REFERENCES: Bent 1938, Stewart 1952, Wallace 1948.

Eastern Screech-Owl

(Otus asio)

A.O.U. No. 373.0





RANGE: Breeding: New Brunswick, w. to s. Alaska, s. to the Florida Keys and c. Mexico. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (Massachusetts) to rare (Maine).

HABITAT: Breeding: Shade trees in towns, orchards, small woodlots, and open woodlands, Wintering: Same as building habitat.

SPECIAL HABITAT REQUIREMENTS: Cavities for nesting and roosting in trees with a minimum d.b.h. of 12 inches (30.5 cm) (Thomas et al. 1979).

NESTING: Egg dates: March 23 to May 11, New York (Bull 1974:329). Clutch size: 3 to 7, typically 4 or 5. Incubation period: 21 to 30 days. Nestling period: About 30 days. Broods per year: 1. Age at sexual Maturity: 1 year (a small percentage breed at 2 years of age). Nest height: 5 to 50 feet (1.5 to 15.2 m), typically 5 to 30 feet (1.5 to 9.1 m). Nest site: Natural cavities and abandoned woodpecker holes, especially those of the Flicker and Pileated Woodpecker. Cavities are also used for roosting and caching food.

TERRITORY SIZE: Variable. Adjacent territories are usually separated by a nondefended area (Burton 1973:101).

SAMPLE DENSITIES: 1 pair per 2.5 square miltes (1 pair 6.5 km^2) in Michigan (Craighead and Craighead 1969:214). 1 pair per 4 square miles (1 pair/10.4 km^2) in Wyoming (Craighead and Craighead 1969:215).

FORAGING: Major foods: Rodents (especially meadow mice) and insects are staples; crayfish, snails, reptiles, amphibians, birds, and fish are also taken. Substrates: Forest floor, meadow grasses. Techniques: Swooping and pounching. Preferred feeding habitat: Grassy openings among widely spaced trees, open fields, meadows, or, in New England, along wooded field margins or streams.

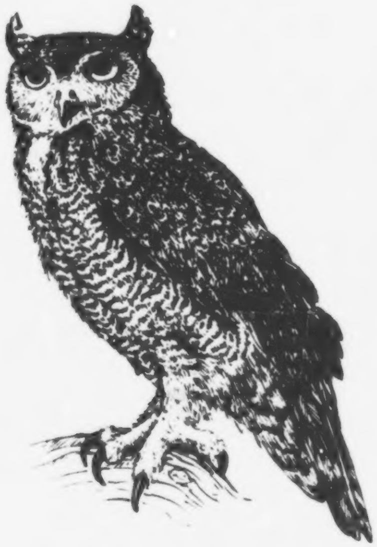
COMMENTS: Nocturnal feeders. Cavities and nest boxes are used by the owls during winter months as feeding stations (food caches). The birds are opportunistic predators, generally consuming animal forms most readily available. May have historically occupied most of northern New England, now rarely found in southern New Hampshire (C. Anderson, personal communication).

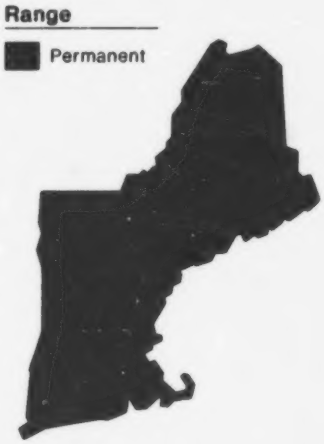
KEY REFERENCES: Bent 1938, Van Camp and Henny 1975. Earhart and Johnson 1970.

Great Horned Owl

(Bubo virginianus)

A.O.U. No. 375.0





RANGE: Breeding: Northern tree limit in Canada, s. to s. South America. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Deep woods remote from populated areas, large farm woodlots, often in deep swamps near a large stream or woodland pond. Mixed countryside of forest and fields. Wintering: Same as breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Large abandoned birds' nests or large cavities for nesting.

NESTING: Egg dates: January 28 to April 18, New York (Bull 1974:331). Clutch size: 1 to 3, typically 2. Incubation period: 28 to 35 days (various reports of 28, 30, and 35 days). Nestling period: 40 to 45 days. Broods per year: 1. Age at sexual maturity: 2 years (about 25 percent breed when 1 year old). Nest height: 30 to 70 feet (1.1 to 21.3 m). Nest site: Commonly uses the old nest of a large bird such as heron, crow, or hawk. Also nests in large natural cavities in trees and on ledges.

SAMPLE DENSITIES: 1 pair per 5.3 square miles (1 pair/13.7 km^2) in Michigan (Craighead and Craighead 1969:214). 1 pair per 3 square miles (1 pair/7.8 km^2) in Wyoming (Craighead and Craighead 1969:215). 1 pair per 1.1 square miles (1 pair/2.8 km^2) in Kansas. Optimum habitat probably supports from 1 to 3 pairs per square mile (0.4 to 1 pair/km^2 (Baumgartner 1939). 1 pair per 4.4 square miles (1 pair/11.4 km^2) in deciduous woodland in New York (Hagar 1957).

FORAGING: Major foods: Lagomorphs and rodents are staple foods; other prey includes birds, small carnivorous mammals, reptiles. Substrate: Forest floor. Techniques: Silent approach to prey via silent, direct, rapid flight, swooping, and pouncing. Preferred feeding habitat: Sometimes leaves woodlands to hunt over meadows and salt marshes.

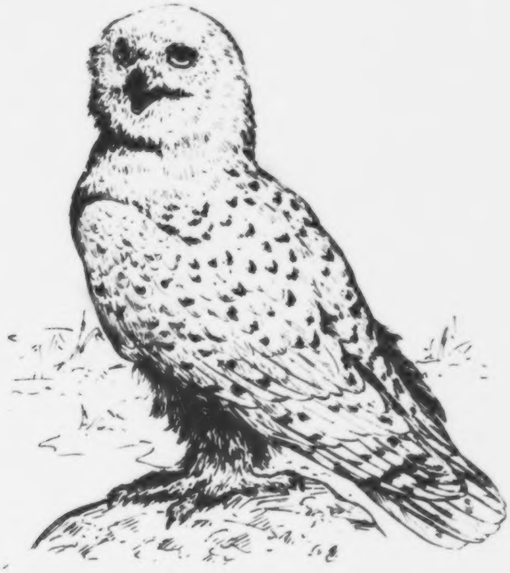
COMMENTS: Crepuscular hunter. Extensive wooded areas with mature trees are preferred over small woodlots with second-growth trees. Birds may have become more tolerant of human activity and occasionally are seen at parks in cities and towns.

KEY REFERENCES: Bent 1938, Earhart and Johnson 1970, Forbush 1929.

Snowy Owl

(Nyctea scandiaca)

A.O.U. No. 376.0



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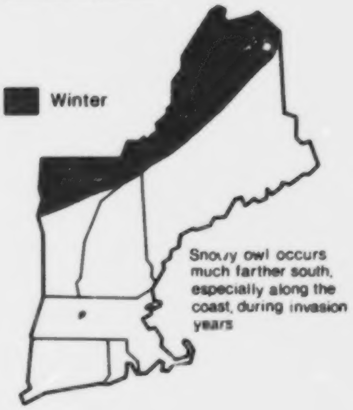


Snowy owl occurs much farther south, especially along the coast, during invasion years

RANGE: Breeding: Arctic tundra n. of the tree line in n. hemisphere. Winter: As far s. as n. New York, Vermont, New Hampshire, and Maine, occasionally occurs s. to n. Alabama and Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Birds move s. periodically in response to crash of lemming population, otherwise, rare in the Northeast.

HABITAT: Open areas along coast, including areas along airport runways.

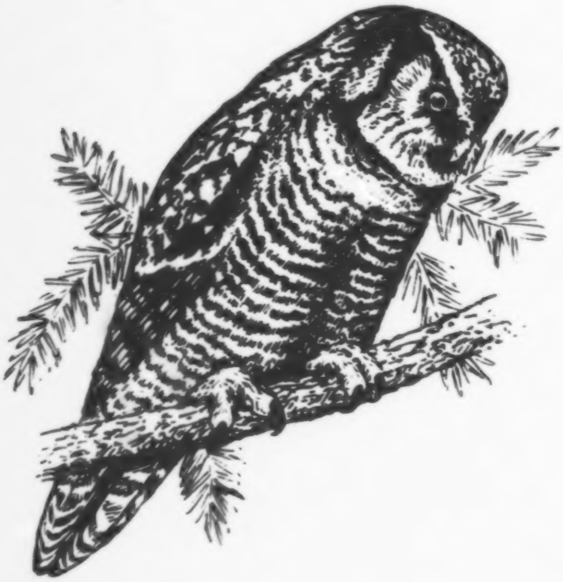
FORAGING: Major foods: Lemmings, other small mammals and small birds. Substrate: snow-covered fields, inland and coastal marshes. Techniques: Hawking, hovering, pouncing.

KEY REFERENCES: Bent 1968, Burton 1973.

Northern Hawk-Owl

(Surnia ulula)

A.O.U. No. 377.0



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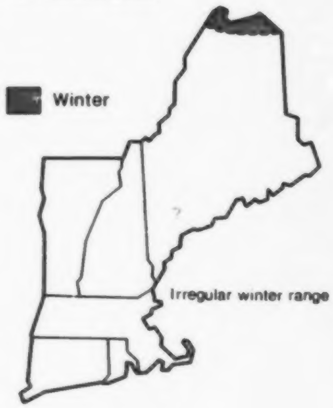


RANGE: Breeding Boreal forest of n. hemisphere. Winter: same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare. Winter: Occasionally trickles down into northeastern states.

HABITAT: Coniferous forest.

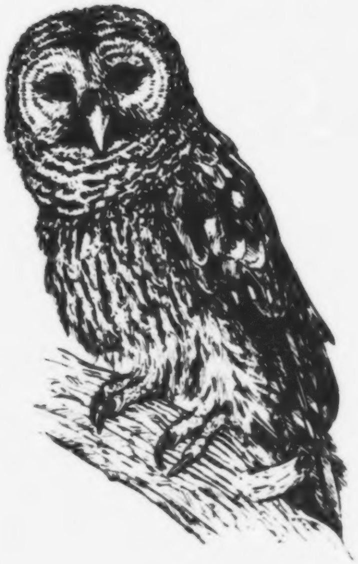
FORAGING: Major foods: Small mammals, and small to medium birds. Substrate: ground. Technique: Hovering and pouncing.

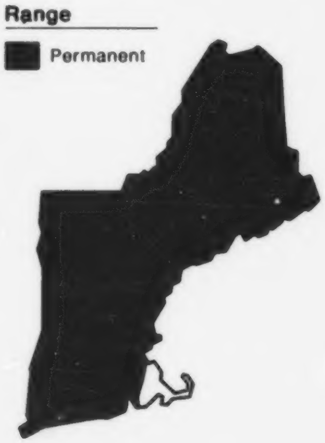
KEY REFERENCES: Bent 1938, Hausman 1966.

Barred Owl

(Strix varia)

A.O.U. No. 368.0





RANGE: Breeding: Newfoundland, w. to Alberta, s. to Florida and the Gulf Coast. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon and scattered.

HABITAT: Breeding: Low, wet deep woods, heavily wooded swamps often near open country where it may hunt for food. Frequently uses mixed or coniferous woods for nesting and roosting. Prefers mature oak woods for nesting and feeding (Hardin and Evans 1977). Wintering: In times of food shortage, birds often migrate south in search of food.

SPECIAL HABITAT REQUIREMENTS: Cool, damp lowlands, large trees with cavities for nesting. Minimum d.b.h. of suitable trees is 20 inches (50.8 cm) (Thomas et al. 1979).

NESTING: Egg dates: March 23 to May 3, New York (Bull 1974:334). Clutch size: 2 to 4, typically 2 or 3. Incubation period: 28 to 33 days. Nestling period: 28 to 35 days. Broods per year: 1. Nest height: To 80 feet (24.4 m). Nest site: Typically in a large natural cavity in a dead tree. Where cavities are scarce, it may use old bird or squirrel nests. In New York, owls often roost in dense stands of hemlock or pines (Bull 1974:333).

HOME RANGE: Average size for 9 owls was 565 acres (228.7 ha) (range 213 to 912 acres (86.2 to 369.2 ha)) in deciduous woodland—open field—marsh habitat in Minnesota (Nicholls and Warner 1972).

SAMPLE DENSITIES: 3 pairs per 36 square miles (3 pairs/ 93.2 km^2) in extensive deciduous woodlots in Michigan (Craighead and Craighead 1969:92). 0.5 pair per 100 acres (40 ha) in lowland forest in Maryland (Stewart and Robbin 1958: 180).

FORAGING: Major foods: Mice (staple) and other small mammals, frogs, birds, insects, crayfish. Substrates: Forest floor, meadow grasses. Techniques: Swooping and pouncing. Preferred feeding habitat: Open fields surrounded by woodland.

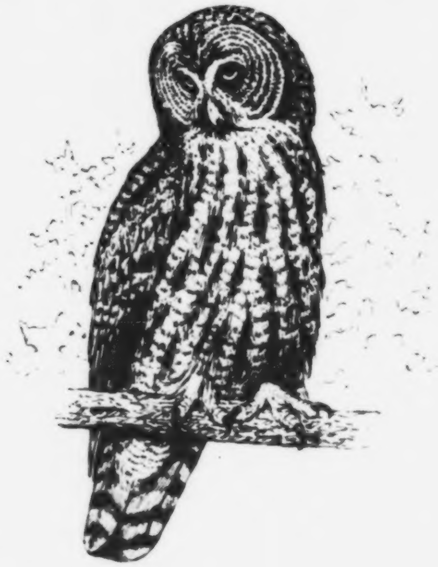
COMMENTS: Barred Owls are nocturnal hunters, but birds with broods may hunt during daylight hours.

KEY REFERENCES: Bent 1938, Errington and McDonald 1937, Forbush 1929.

Great Gray Owl

(Strix nebulosa)

A.O.U. No. 370.0



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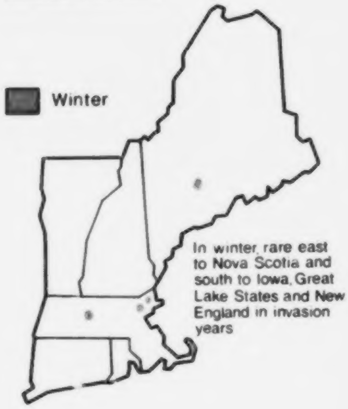
▨ Winter
In winter, rare east to Nova Scotia and south to Iowa, Great Lake States and New England in invasion years

RANGE: Breeding: Boreal forest throughout the n. hemisphere. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare. May invade the Northeastern United States in large numbers when the snow is deep and food is in low supply farther north.

HABITAT: While wintering in settled parts of the country, various woodland types, frequently deciduous are used. Often hunts meadow mice in open fields using fence posts, low trees, shrubbery, and wooded edges as lookouts. (Godfrey 1979:217)

FORAGING: Major foods: Small mammals, small birds. Substrate: Ground. Technique: Swooping and pouncing. Preferred feeding habitat: Meadows.

KEY REFERENCES: Burton 1973, Godfrey 1979.

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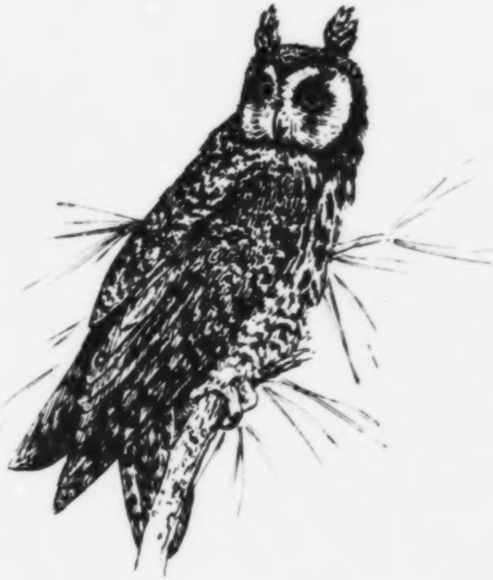
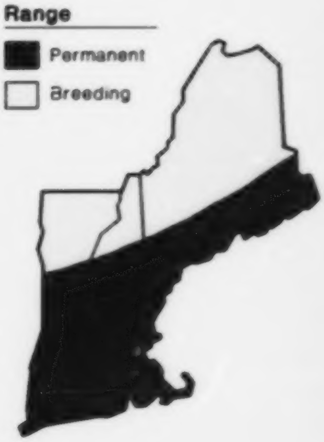
Long-eared Owl

(Asio otus)

A.O.U. No. 366.0





RANGE: Breeding: Newfoundland, Quebec, w. to British Columbia, s. to Virginia and Arkansas. Winter: Central Maine w. to British Columbia, s. to Florida and c. Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (Maine) to rare (Massachusetts) in breeding season. Uncommon in winter.

HABITAT: Breeding: Deciduous or coniferous (coniferous preferred) and open or dense woodlands, wooded parks, sometimes in small woodlots. Wooded swamps, evergreen plantations. Wintering: Birds roost deep within groves of evergreens that may be several miles from extensive forest.

SPECIAL HABITAT REQUIREMENTS: Dense vegetation for nesting and roosting cover.

NESTING: Egg dates: March 21 to May 23, New York (Bull 1974:336). Clutch size: 3 to 8, typically 4 to 5. Incubation period: About 28 days. Age at first flight: 23 to 24 days. Broods per year: 1. Nest site: Often in old crow, hawk, or squirrel nest, sometimes in natural tree cavities or on top of broken stubs. Rarely on ground or ledges.

SAMPLE DENSITIES: 1 pair per 37 square miles (1 pair/95.8 km^2) in Michigan. 1 pair per 4 square miles (1 pair/10.4 km^2) in Wyoming (Craighead and Craighead 1969:212, 215). 1 pair per 0.1 to 0.4 square mile (1 pair/0.3 to 1.0 km^2) in Wyoming (Craighead and Craighead 1969:264).

FORAGING: Mice (staple) and other small mammals, reptiles, amphibians, insects, occasionally takes small birds. Substrates: Forest floor, meadow grasses. Techniques: Swooping and pouncing. Preferred feeding habitat: Both wooded and open country.

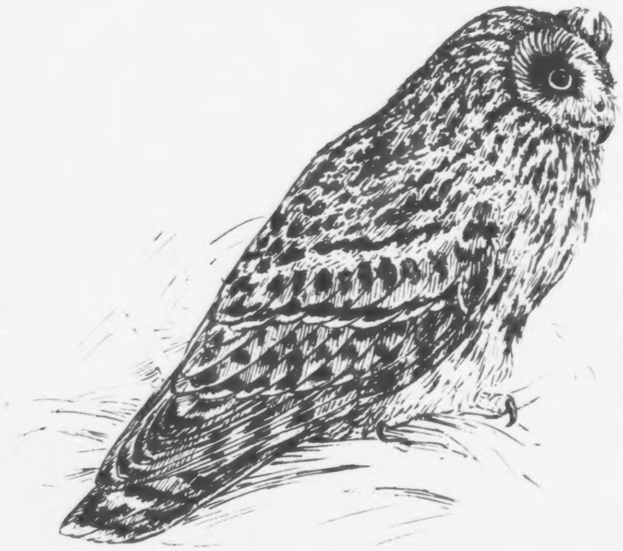
COMMENTS: Birds are gregarious in winter with flocks of 5 to 25 occupying communal roosts (Pough 1949:19). Their quiet and nocturnal habits make them difficult to observe in all seasons.

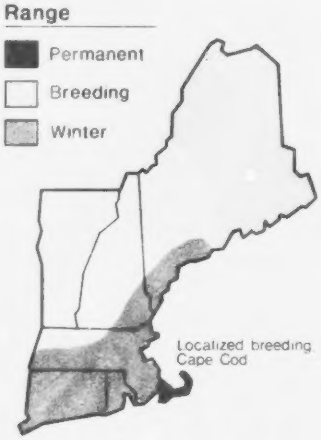
KEY REFERENCES: Armstrong 1958, Bent 1938, Forbush 1929.

Short-eared Owl

(Asio flammeus)

A.O.U. No. 367.0





RANGE: Breeding: Arctic, s. to New Jersey, Ohio and c. California. Winter: Massachusetts, Ohio, s. British Columbia, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon in general but occasionally locally common along coast in breeding season. Winters locally throughout.

HABITAT: Breeding: Open grasslands, plains, marshes, dunes. Wintering: Same as breeding habitat generally preferring to winter in localities with little or no snow.

SPECIAL HABITAT REQUIREMENTS: Extensive open grasslands with abundant rodents.

NESTING: Egg dates: April 12 to May 19, New York (Bull 1974:338). Clutch size: 4 to 9, typically 5 to 7. Incubation period: About 21 days. Age at first flight: About 28 days. Nestling period: 12 to 16 days. Broods per year: 1. Nest site: On the ground in clumps of weeds or grasses; rarely in burrows.

TERRITORY SIZE: 73.9 to 121.4 ha (182.5 to 299.8 acres) in sedges and rushes in New York (Clark 1975:43).

FORAGING: Major foods: Mice, insects, occasionally birds. Substrates: Grass—fields, dunes. Techniques: Hawking, hovering, and pouncing.

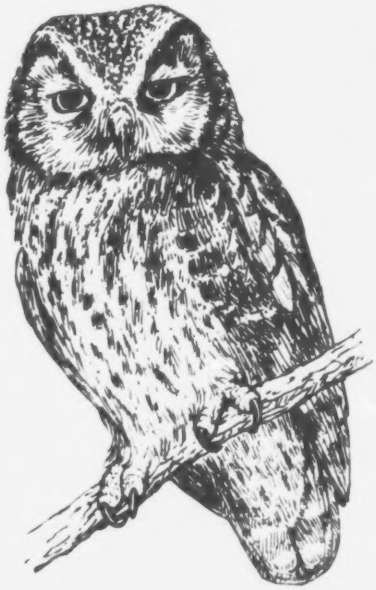
COMMENTS: In winter, birds tend to roost in groups in open field or close to ground in conifers or brush if snow is deep. Birds often hunt by day (especially dawn and dusk) and depend almost totally on rodents.

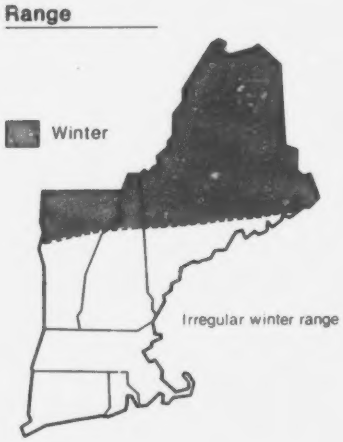
KEY REFERENCES: Bent 1939, Clark 1975, Short and Drew 1962, Stegeman 1957.

Boreal Owl

(Aegolius funereus)

A.O.U. No. 371.0





RANGE: Breeding: Boreal forests of western hemisphere. Winter: same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Occasionally winters in northeastern border states.

HABITAT: Mixed hardwoods and coniferous forests.

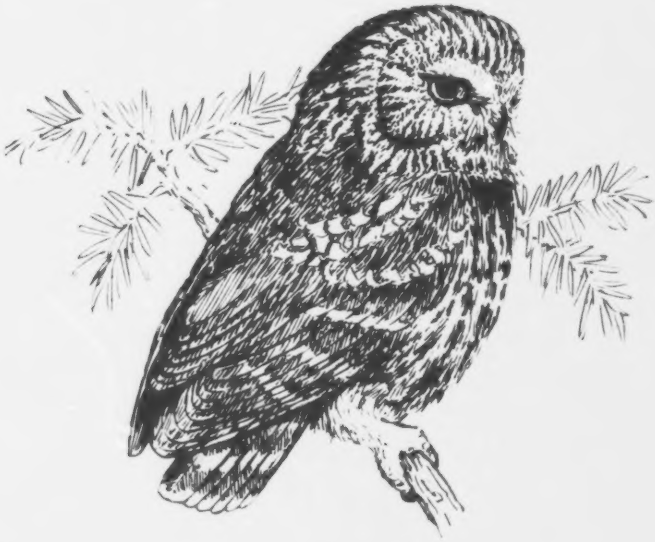
FORAGING: Major foods: Small mammals and small birds. Substrate: Forest floor. Technique: Swooping and pouncing.

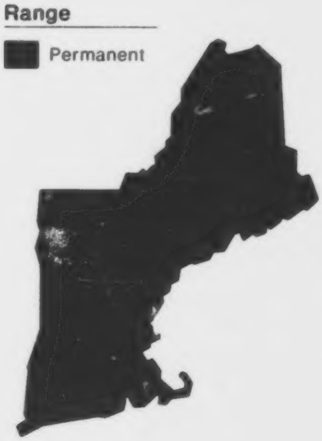
KEY REFERENCE: Burton 1973.

Northern Saw-whet Owl

(Aegolius acadicus)

A.O.U. No. 372.0





RANGE: Breeding: Nova Scotia, w. to se. Alaska, s. to c. Ohio and s. New England. Breeds in the mountains from Maryland to Missouri. Winter: Regularly s. to Virginia and casually to s. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Uses a variety of habitats, including woodlots, roadside shade trees, coniferous and deciduous forests. Swampy areas in deep coniferous forests are preferred over dry deciduous woods (Pough 1949:23). Mature mixed forests with scattered dead trees are preferred nesting habitats (Angell 1974). Wintering: When deep snow makes food unavailable, birds may move s. in search of prey. Birds roost in conifers at edge or interior of extensive woodlands. Also in coniferous thickets in parks and isolated pines.

SPECIAL HABITAT REQUIREMENTS: Cavity in tree with a minimum d.b.h. of 12 inches (30.5 cm) (Thomas et al. 1979).

NESTING: Egg dates: March 31 to June 11, New York (Bull 1974:340). Clutch size: 4 to 7, typically 5 or 6. Incubation period: 21 to 28 days. Broods per year: 1 (Terrill 1931). Nest height: 14 to 60 feet (4.3 to 18.3 m). Typically 20 to 40 feet (6.1 to 12.2 m). Nest site: Usually in cavity of dead tree. Prefers old deserted Woodpecker holes, especially those of Flickers. Birds accept nest boxes with a layer of straw or sawdust inside.

HOME RANGE: Approximately 350 acres (141.7 ha) in Minnesota (Simpson 1972).

SAMPLE DENSITIES: 1 bird per 1.86 square miles (1 bird/4.8 km^2) in spruce-fir in mountains of North Carolina (Simpson 1972). Maximum 1 pair per 40 ha (100 acres) (Hardin and Evans 1977).

FORAGING: Major foods: Mainly small mammals—especially mice, young squirrels, shrews, chipmunks; also takes insects and occasionally small birds. Substrate: Forest floor. Techniques: Swooping and pouncing.

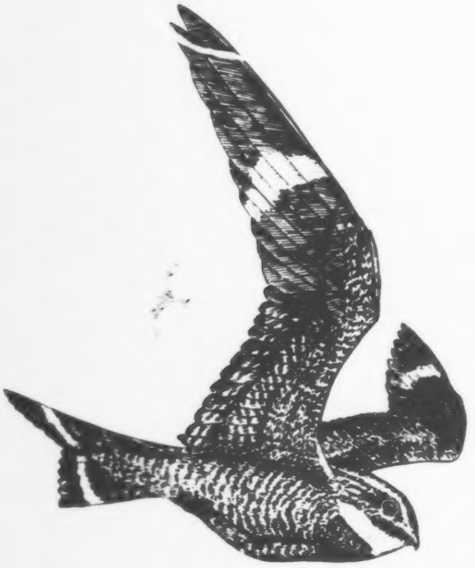
COMMENTS: Saw-whet Owls hunt and roost close to the ground. They are nocturnal and so are seldom seen.

KEY REFERENCES: Bent 1938, Mendall 1944, Randle and Austing 1952.

Common Nighthawk

(Chordeiles minor)

A.O.U. No. 420.0



Range
☐ Breeding

RANGE: Breeding: Newfoundland, Quebec, w. to s. Yukon, s. to the Gulf States and n. Mexico. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to rare.

HABITAT: Breeding: Open areas such as plowed fields, gravel beaches, barren areas with rocky soil, railroad right-of-ways, large woodland clearings, cities. Nesting in cities restricted to gravel roofs. Most Massachusetts birds nest on gravel roofs.

NESTING: Egg dates: May 25 to July 25, New York (Bull 1974:345). Clutch size: 1 or 2, typically 2. Incubation period: 19 days. Age at first flight: About 3 weeks. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest site: Builds no nest. Lays eggs on bare ground usually on gravel or partially vegetated soil, roof tops; always in open.

TERRITORY SIZE: Armstrong (1965) found that territories coincided with breeding home ranges in Michigan (see Home Range).

HOME RANGE: 4.1 to 22.8 ha (10.1 to 56.3 acres) (average 10.4 ha (25.7 acres)) per pair in Michigan (Armstrong 1965).

SAMPLE DENSITIES: 13 birds per 130 ha (321.1 acres) in Michigan (Armstrong 1965).

FORAGING: Major foods: Flying insects, especially flying ants, mosquitos, moths, grasshoppers. Substrate: Air. Technique: Air screening.

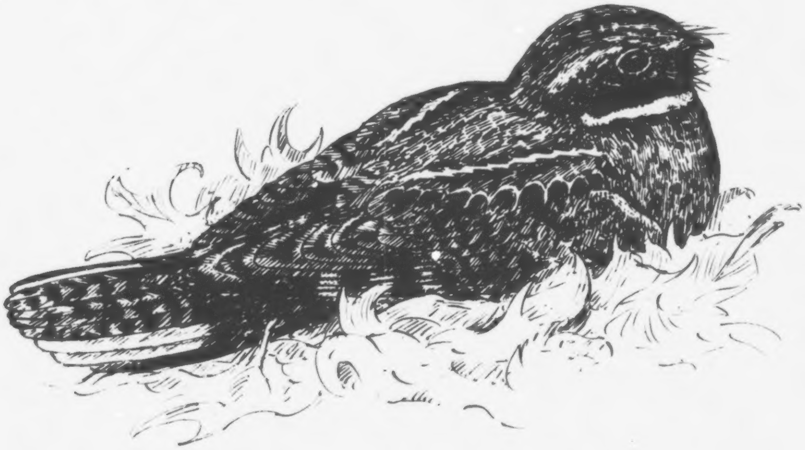
COMMENTS: Birds are mainly crepuscular and nocturnal but occasionally feed during the day. Numbers seem to be declining in New Hampshire (C. Anderson, personal communication).

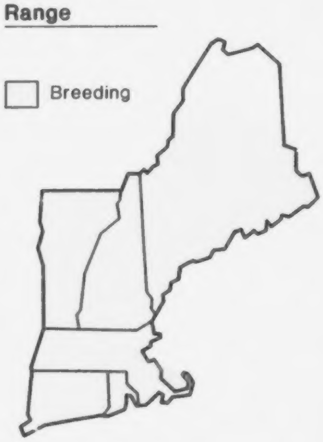
KEY REFERENCES: Armstrong 1965, Bent 1940, Rust 1963.

Whip-poor-will

(Caprimulgus vociferus)

A.O.U. No. 417.0





RANGE: Breeding: Nova Scotia and s. Quebec, w. to c. Saskatchewan, s. to e. Virginia (coast), Alabama, Georgia (mountains), and Texas. Winter: South Carolina, w. to the Gulf States and s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Dry, open, predominantly deciduous woodlands—often with small to medium trees of pine, oak, and beech. Less common breeder in mature forests; avoids mountains.

NESTING: Egg dates: May 16 to June 30, New York (Bull 1974:344). Clutch size: 1 or 2, typically 2. Incubation period: 20 days. Broods per year: 1 or 2 (Bull 1974:344). Age at sexual maturity: 1 year. Nest site: Builds no nest. Eggs are laid on well-drained ground in the open or under a bush. Often among trees at edge of clearing or path.

TERRITORY SIZE: 14.9 acres (6 ha), 25.5 acres (11.1 ha), and 6.9 acres (2.8 ha) in oak, hickory, elm woodlands in Kansas (Fitch 1958).

SAMPLE DENSITIES: 1.4 territorial males per 100 acres (40 ha) in upland forest and brush habitat in Maryland (Stewart and Robbins 1958:184).

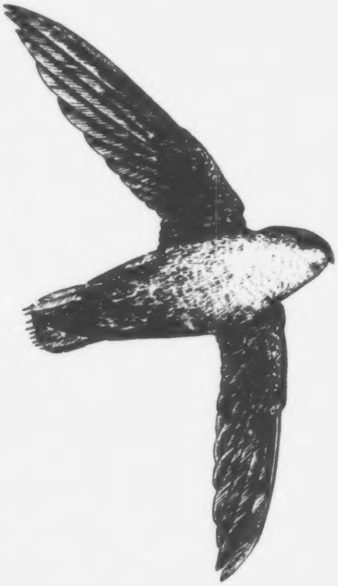
FORAGING: Major foods: Mainly flying insects but occasionally takes crickets, ants, and beetles from the ground (Bent 1940). Substrates: Air, leaf litter. Technique: Air screening.

KEY REFERENCES: Bent 1940, Raynor 1941.

Chimney Swift

(Chaetura pelagica)

A.O.U. No. 423.0



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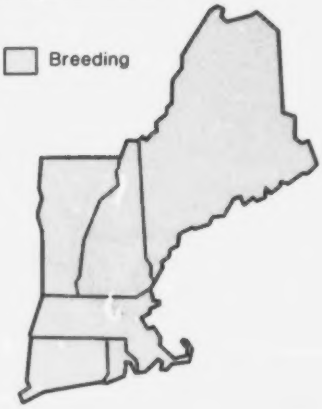


RANGE: Breeding: Southern Canadian provinces, s. to Florida and the Gulf Coast. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Breeding: The vicinity of buildings in towns, cities, farms.

SPECIAL HABITAT REQUIREMENTS: Chimneys.

NESTING: Egg dates: May 30 to July 27, New York (Bull 1974:347). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 18 to 21 days. Nestling period: 1 or 2 days (able to crawl out of nest but unable to fly). Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Formerly nested in hollow trees but has adapted to chimneys, silos, building walls, rafters, airshafts, old wells. At Kent, Ohio, birds typically nested in ventilation shafts at an average depth of about 20 feet (6 m) (Dexter 1977). Solitary or colonial nesters.

SAMPLE DENSITIES: 0.6 pair per 100 acres (40 ha) in mixed forest, brush and field, and near buildings with chimneys (Stewart and Robbins 1958:187).

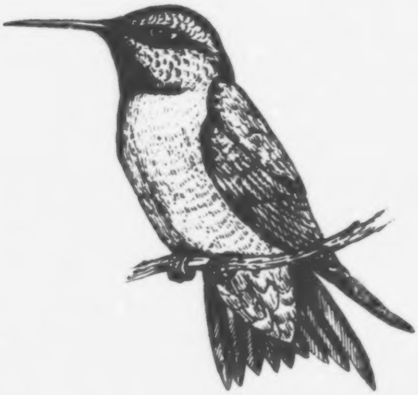
FORAGING: Major foods: Flying insects. Substrate: Air. Technique: Air screening.

KEY REFERENCES: Bent 1940, Dexter 1977, Fischer 1958.

Ruby-throated Hummingbird

(Archilochus colubris)

A.O.U. No. 428.0



Range
☐ Breeding

RANGE: Breeding: Nova Scotia, w. to s. Alberta, s. to Florida and Texas. Winter: Mexico and Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Mixed woodlands, shade trees in residential landscapes, orchards. Often near streams and wooded swamps.

SPECIAL HABITAT REQUIREMENTS: Abundant flowers, preferably red.

NESTING: Egg dates: May 21 to August 16, New York (Bull 1974:348). Clutch size: Invariably lays 2 eggs. Incubation period: 11 to 16 days. Nestling period: 14 to 28 days (Bent 1940). Broods per year: 1. Nest height: 6 to 50 feet (1.8 to 15.2 m), typically 10 to 20 feet (3.0 to 6.1 m). Nest site: Nest is usually built in the saddle of a drooping limb of a shrub or tree often near, and sometimes directly over, water or near a woodland trail. It is usually sheltered above by leaves and branches and exposed to the ground below.

TERRITORY SIZE: Female alone defends immediate area of surrounding nest. A male in Ohio defended a feeding territory of 0.25 acre (0.1 ha) (Pitelka 1942).

SAMPLE DENSITIES: Maryland—15 pairs per 100 acres (40 ha) in well-drained floodplain forest. 8 pairs per 100 acres (40 ha) in upland oak forest. 6 pairs per 100 acres (40 ha) in mature northern hardwood forest. 4 pairs per 100 acres (40 ha) in hedgerows and active and abandoned farmland (Stewart and Robbins 1958:188).

FORAGING: Major foods: small insects, nectar, sap. Substrate: Flowers. Techniques: Hovering, hawking. Preferred feeding habitat: Wherever there are abundant flowers.

COMMENTS: Pair bond: males are polygynous. Sexes migrate separately with males arriving in the Northeast several days before the females. In fall, males leave for wintering grounds a month before females and young.

KEY REFERENCES: Bent 1940, Pickens 1936, Pitelka 1942.

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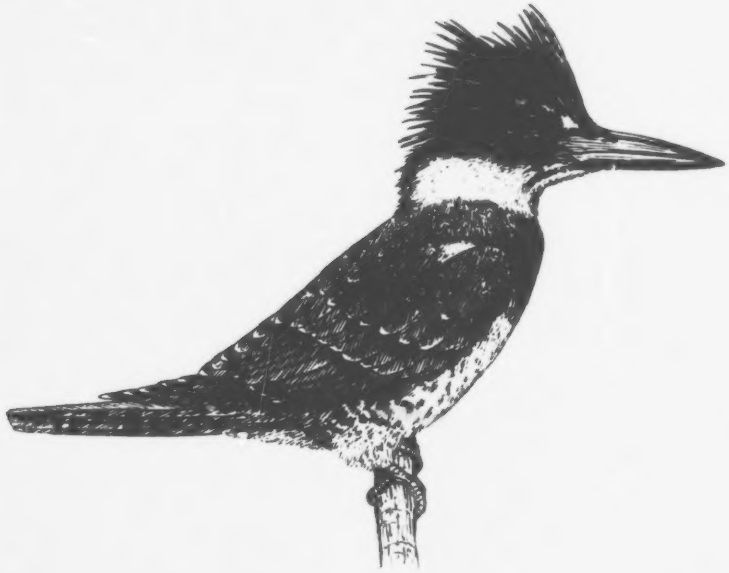
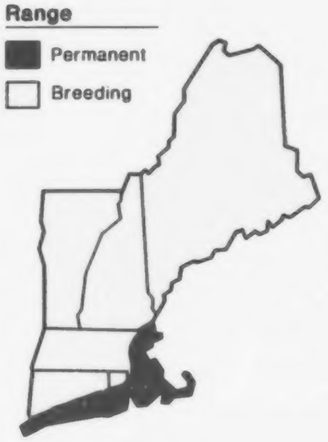
Belted Kingfisher

(Ceryle alcyon)

A.O.U. No. 390.0





RANGE: Breeding: Mackenzie district, Northwest Territories and n. Alaska, s. to Florida, Texas, and s. California. Winter; Great Lakes and s. New England, s. to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in breeding season. Uncommon in winter.

HABITAT: Breeding: Banks near ponds, lakes, rivers, and streams that contain fish. Wintering: Near ice-free waters that allow access to food.

SPECIAL HABITAT REQUIREMENTS: Banks for nest sites within a mile of water. Water with low turbidity and adequate food supply. Perches near water for sighting prey.

NESTING: Egg dates: May 1 to June 10, New York (Bull 1974: 349). Clutch size: 5 to 8, typically 6 or 7. Incubation period: 23 to 24 days. Nestling period: 31 to 32 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Typically 3 to 6 feet (1 to 2 m) deep in a burrow in a bank of sandy clay or gravel near water. Banks may be up to a mile from water forcing birds to travel to distant feeding areas.

HOME RANGE: 2 pairs on 2 lakes used 0.5 mile (0.8 km) of shoreline (Sayler and Lagler 1946). 0.5 to 5 miles (0.8 to 8 km) from nest site (Cornwell 1963).

SAMPLE DENSITIES: 1 pair per 1.8 square miles (1 pair/ 4.7 km^2) in Minnesota (Cornwell 1963).

FORAGING: Major foods: Fish (staple), crayfish, insects, mollusks, tadpoles, occasionally takes fleshy fruits. Substrates: Shallow water (less than 2 feet (0.6 m) deep). Techniques: Diving, skimming water surface. Preferred feeding habitat: Shallow borders of bodies of water.

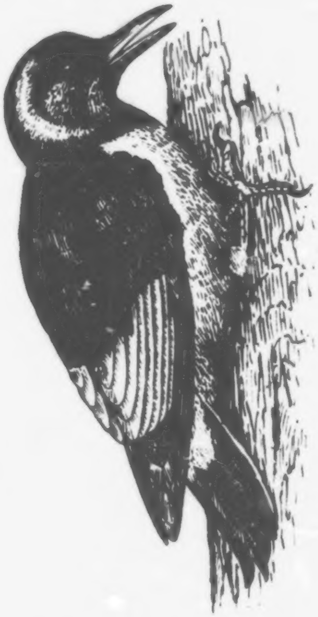
COMMENTS: Large lakes that become turbid due to wave action have fewer Kingfishers than small clear bodies of water.

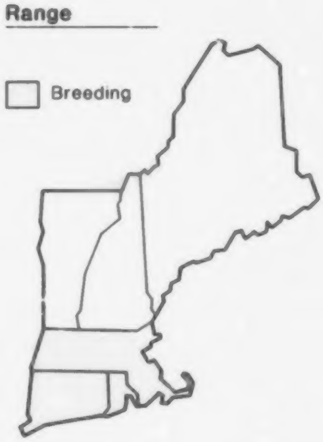
KEY REFERENCES: Bent 1940, Cornwell 1963, Sayler and Lagler 1946, White 1953.

Red-headed Woodpecker

(Melanerpes erythrocephalus)

A.O.U. No. 406.0





RANGE: Breeding: Southwestern Quebec, w. to se. Alberta, s. to the Gulf Coast. Does not breed in n. New England. Winter; Southeastern Pennsylvania, w. to Oklahoma and s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Lowland and upland habitats, river bottoms, wooded swamps, beaver ponds, open deciduous woods, groves of dead and dying trees, orchards, open agricultural country. Prefers savanna-like grasslands with scattered trees and forest edges. Wintering: Birds move from forest interior. Oaks and maples that provide mast may be important components of winter habitat (Willson 1970, Reller 1972).

SPECIAL HABITAT REQUIREMENTS: Prefers open areas with snags and lush herbaceous ground cover (Hardin and Evans 1977).

NESTING: Egg dates: May 16 to June 19, New York (Bull 1974:355). Clutch size: 4 to 7, typically 5. Incubation period: About 14 days. Broods per year: 1 or 2 Age at sexual maturity: 1 year. Nest height: 8 to 80 feet (2.4 to 24.4 m), typically 23 to 40 feet (7 to 12.4 m). Nest site: Tree cavity usually excavated in dead tree or limb without bark that is surrounded by open space, utility poles, avoids bird houses. Prefers open woods with dead trees and herbaceous ground cover.

TERRITORY SIZE: In winter the birds restrict their activities to small, well-defined territories (Kilham 1958b).

SAMPLE DENSITIES: 9 to 12 birds per 100 acres (40 ha) in bottomland woods with much edge and large internal openings (oak-hickory-hackberry-elm community) (Graber et al. 1977). 25 birds per 100 acres (40 ha) in suburban-residential habitat (Cooke 1916 in Graber et al. 1977). 28 birds per 100 acres (40 ha) in shrub area (Graber and Graber 1963).

FORAGING: Major foods: Insect larvae and adults, wild fruits, acorns (especially those of pin oak), beechnuts, corn. Substrates: Ground, trunks, and limbs. Techniques: Drilling, probing, ground gleaning, hawking. Preferred feeding habitat: Open areas adjacent to woodlots (Connor 1976); upper parts of trees in winter (Williams 1975b).

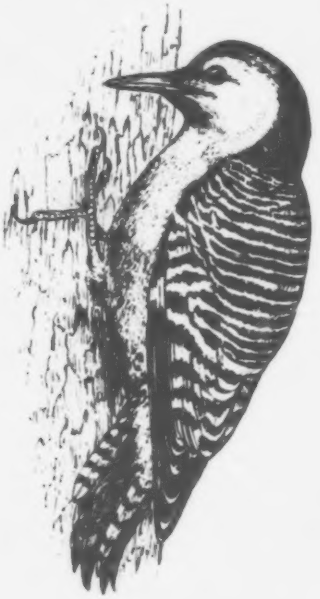
COMMENTS: Reller (1972) found that Red-headed Woodpeckers favored cavities in trunks rather than limbs. Red-headed populations have increased following the death of trees over a large area by fire, flood, or disease (Graber et al. 1977). Woodlots used for nesting in sw. Virginia ranged from 0.5 to 20.0 ha (1.2 to 50 acres) (Conner 1976).

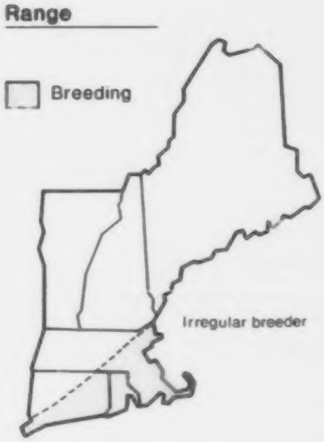
KEY REFERENCES: Bent 1939, Conner 1976, Graber et al. 1977, Reller 1972.

Red-bellied Woodpecker

(Melanerpes carolinus)

A.O.U. No. 409.0





RANGE: Breeding: New Jersey, Pennsylvania, New York, w. to s. Minnesota, s. to the Gulf Coast. Occasionally breeds in s. New England. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to rare.

HABITAT: Breeding: Deciduous and coniferous forests and edges; frequents uplands but prefers bottomlands, woodlots near farms and villages, orchards. Wintering: Similar to breeding habitat. Birds are sedentary, remaining on breeding grounds year-round.

SPECIAL HABITAT REQUIREMENTS: Extensive mature woodlands with dead trees or trees with large dead limbs for nesting.

NESTING: Egg dates: April 26 to June 28, New York (Bull 1974:354). Clutch size: 3 to 8, typically 4 to 6. Incubation period: 14 days. Broods per year: 1 (north), 2 (south). Age at sexual maturity: 1 year. Nest height: 5 to 70 feet (1.5 to 21.3 m). Nest site: Cavity in sound or soft wood, often in limb at edge of woodland, less often in trunk of dying or dead tree, building, utility pole, or stump. Frequently uses nesting boxes. May excavate a cavity or occupy an existing one (Kilham 1958a).

TERRITORY SIZE: Average 6.1 acres (2.5 ha) (3 territories) in virgin floodplain forest in Illinois. Average 4.4 acres (1.8 ha) (2 territories) in mature upland forest in Illinois (Graber et al. 1977). Winter: 3 to 4 acres (1.2 to 1.6 ha) (Kilham 1963).

SAMPLE DENSITIES: 23 birds per 100 acres (40 ha) in virgin floodplain (elm-maple) forest in Illinois. 6 birds per 100 acres (40 ha) in bottomland forest in Illinois (Graber et al. 1977). 19 pairs per 100 acres (40 ha) in white oak, tulip-poplar forest in Maryland (Stewart and Robbins 1958:193).

FORAGING: Major foods: Insects, especially ants and beetles; beech and acorn mast, corn, wild fruits. Substrates: Upper dead limbs of trees, ground. Techniques: Scaling, probing, gleaning tree surfaces, drilling, ground foraging. Preferred feeding habitat: Lowlands (Williams 1975). Birds may seek food in areas outside of breeding habitat (such as cornfields) (Reller 1972).

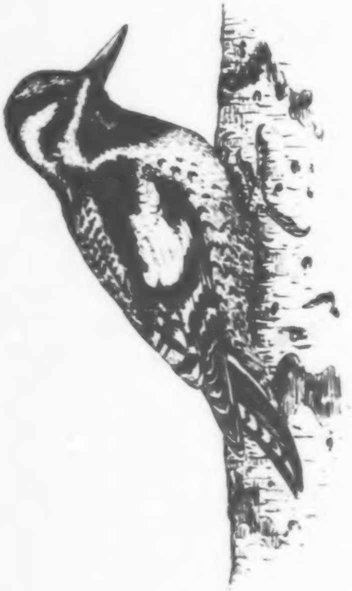
COMMENTS: Reller (1972) found that Red-bellied Woodpeckers favored dead limbs in living trees for nest sites—birds compete with starlings for cavities. Birds often store food in crevices for later use (Kilham 1963). Yeager (1955) noted that populations increased where flooding had killed trees.

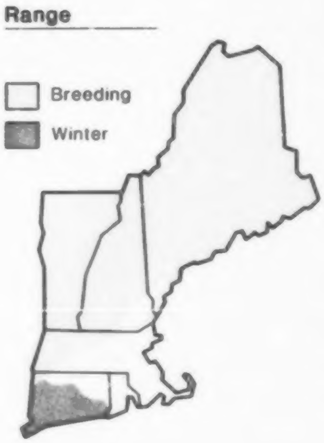
KEY REFERENCES: Bent 1939, Graber et al. 1977, Kilham 1963, Reller 1972.

Yellow-bellied Sapsucker

(Sphyrapicus varius)

A.O.U. No. 402.0





RANGE: Breeding: Newfoundland, w. to Alaska, s. to the mountains of Massachusetts, Virginia, Georgia, Missouri, and New Mexico. Winter: Southern New England w. to Kansas and s. British Columbia, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (se. New York) to common (Maine).

HABITAT: Breeding: Mixed hardwood-conifer forests, especially near water and small clearings, woodlots, occasionally in orchards. Wintering: Floodplain forest and mature ornamental conifers.

SPECIAL HABITAT REQUIREMENTS: Trees with a d.b.h. of 10 inches (25.4 cm) or more are most suitable for nesting (Thomas et al. 1979).

NESTING: Egg dates: April 29 to June 19, New York (Bull 1974:358). Clutch size: 4 to 7, typically 5 or 6. Incubation period: 12 to 14 days. Nestling period: 24 to 26 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 8 to 40 feet (2.4 to 12.2 m) Nest site: Excavates a cavity in a dead or living tree with rotten heartwood. Nests in a variety of trees but prefers aspen when available (Lawrence 1967, Howell 1952). Favors trees infected with *Fomes* (Kilham 1971).

TERRITORY SIZE: Varies from immediate vicinity of nest to 150 yards (137.2 m) or more (Howell 1952).

HOME RANGE. 5.1 acres (2.1 ha) and 5.4 acres (2.2 ha) for 2 pairs in mature second-growth forest in Ontario (Lawrence 1967).

SAMPLE DENSITIES: Winter — 12 birds per 100 acres (40 ha) in bottomland forest in Illinois (Graber et al. 1977).

FORAGING: Major foods: Inner bark of trees, sap, insects (excluding wood-boring larvae), fruits and berries. Substrates: Smooth bark on trunks of small and large living trees and limbs of larger trees. Techniques: Drilling, hawking, probing.

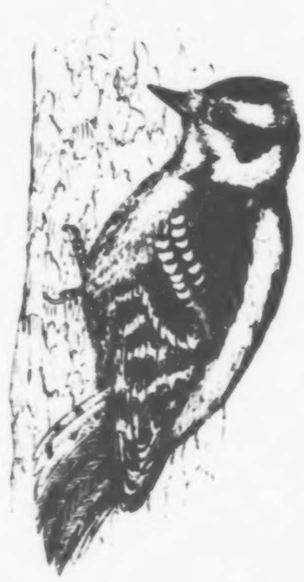
COMMENTS: Beal (1911 in Graber et al. 1977) found that the contents of 313 stomachs contained 49 percent animal and 51 percent vegetable matter. Poison ivy berries are an important winter food during prolonged subfreezing weather (Robbins, personal communication).

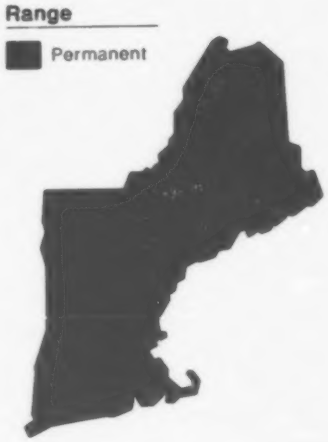
KEY REFERENCES: Bent 1939, Graber et al. 1977, Howell 1952, Kilham 1962, Lawrence 1967.

Downy Woodpecker

(Picoides pubescens)

A.O.U. No. 394.0





RANGE: Breeding: Newfoundland, w. to nw. Alaska, s. to Florida and New Mexico. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Interior and edges of open mixed woodlots and forests (prefers bottomlands), orchards, shade trees in towns, suburbs. Prefers habitat with living and dead medium-sized trees 10 to 22 inches (25.4 to 55.9 cm) d.b.h. Shugart et al. (1974) found a high correlation between downy distribution and sapling density, indicating that sapling removal may decrease downy habitat. Wintering: Bottomland forest, shrub habitat, upland areas with large trees, forest edges. Birds on high mountains move to lower elevations.

SPECIAL HABITAT REQUIREMENTS: Trees greater than 6 inches (15.2 cm) d.b.h. for nesting (Thomas et al. 1979).

NESTING: Egg dates: May 6 to June 30, New York (Bull 1974:359). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 12 days. Nestling period: 20 to 22 days (postfledgling care continues for 3 weeks) (Lawrence 1967). Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 3 to 50 feet (0.9 to 15.2 m), typically 20 feet (6.1 m). Nest site: Cavity in living or dead tree, in sound or rotting wood, stump, often on underside of limb. Conner and others (1975) found nests in trees 8 to 12 inches (20 to 30 cm) d.b.h. Prefers to nest in open woodlands in upper parts of dead trees (Scott et al. 1977). Cavity excavated for courtship activity and nesting. A separate cavity is excavated in fall for winter roosting (Harrison 1975). Often re-excavates same tree year after year (Hardin and Evans 1977).

TERRITORY SIZE: 1.3 to 3.1 acres (0.5 to 1.3 ha) (average 2.0 acres (0.8 ha)) for 9 pairs in mature lowland forest in Illinois (Calef 1953 in Graber et al. 1977).

HOME RANGE: 5 to 8 acres (2.0 to 3.2 ha) is estimated size for 2 pairs in second-growth forest in Ontario (Lawrence 1967).

SAMPLE DENSITIES: 36 birds per 100 acres (40 ha) in virgin floodplain forest in Illinois (Snyder et al. 1948). Maximum 13 pairs per 40 ha (100 acres) (Hardin and Evans 1977).

FORAGING: Major foods: Insects, especially wood-boring ants and beetle larvae. Substrates: Bark crevices, trunks and branches of living and dead trees, under loose bark. Techniques: Scaling, drilling, probing, gleaning, flight-gleaning, hawking. Preferred feeding habitat: Woodlands with elms and oaks. Downies generally feed on lower branches and trunk.

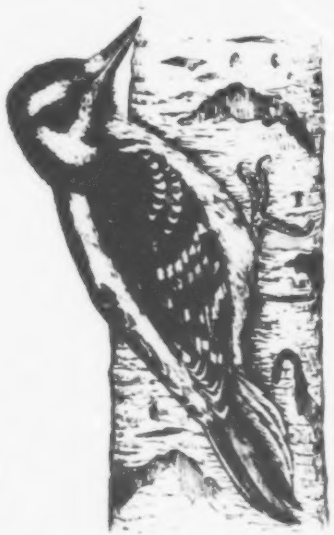
COMMENTS: Females tend to forage on small branches less than 5 cm (2 inches) in diameter; males tend to forage on trunks (Jackson 1970). Beal (1911 in Bent 1939) found 76 percent animal and 24 percent vegetable material in 723 stomachs.

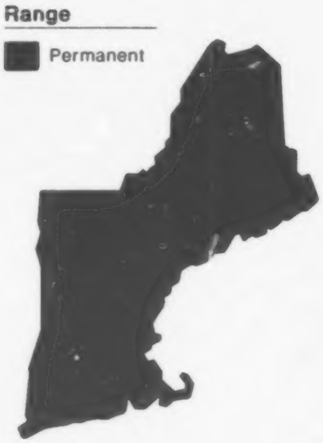
KEY REFERENCES: Conner et al. 1975, Graber et al. 1977, Jackson 1970, Lawrence 1967.

Hairy Woodpecker

(Picoides villosus)

A.O.U. No. 393.0





RANGE: Breeding: Newfoundland, w. to Alaska, s. to Central America. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Open coniferous, deciduous and mixed woodlands with mature living and dead trees, wooded swamps. Prefers bottomland areas with large trees. Wintering: A shift to more residential habitat occurred in s. Illinois (Graber et al. 1977). Birds may move to more open country (Pough 1949).

SPECIAL HABITAT REQUIREMENTS: Trees with a d.b.h. of 10 inches (25.4 cm) or more are most suitable for nesting (Thomas et al. 1979).

NESTING: Egg dates: April 23 to May 19, New York (Bull 1974:359). Clutch size: 3 to 6, typically 4. Incubation period: 11 to 12 days. Nestling period: 28 to 30 days. Broods per year: 1 (north), 2 (south). Age at sexual maturity: 1 year. Nest height: 15 to 45 feet (4.6 to 13.7 m), typically 35 feet (10.7 m). Nest site: Cavity in living (often) or dead tree, in trunk or underside of large limb. Favors trees with decayed interiors. Conner and others (1975) found nests in trees with d.b.h. range of 12 to 18 inches (30.5 to 45.7 cm). Nests were in both dead trees and dead parts of living trees in sparsely to fully stocked stands.

TERRITORY SIZE: 6.5 acres (2.6 ha) (one territory) in mature upland forest in Illinois (Allison 1947 in Graber et al. 1977). 1.6 to 3.7 acres (0.6 to 1.5 ha) (average 2.6 acres, 1.1 ha) in mature bottomland in Illinois (Calef 1953 in Graber et al. 1977).

HOME RANGE: 6 to 8 acres (2.4 to 3.2 ha) (estimated minimum sizes of 2 ranges) in second growth forest in Ontario (Lawrence 1967).

SAMPLE DENSITIES: 17 to 24 birds per 100 acres (40 ha) in mature bottomland forest in Illinois (Calef 1953 in Graber et al. 1977). 4 birds per 100 acres (40 ha) in upland oak-hickory forest in Illinois (Franks and Martin 1967).

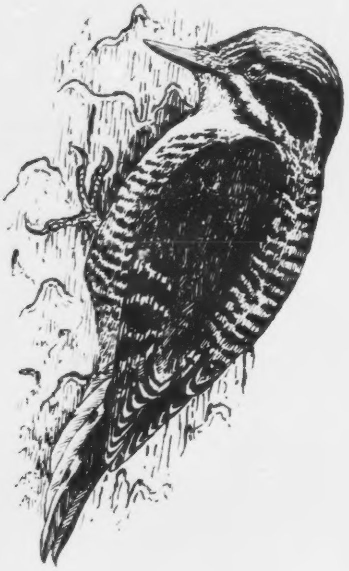
FORAGING: Major foods: Adults and larvae of beetles, ants and caterpillars are staples, but also eats fruits, nuts, corn. Substrates: Bark crevices of living and dead trees, trunks, branches, rotting stumps, under loose bark. Techniques: Gleaning, drilling, scaling.

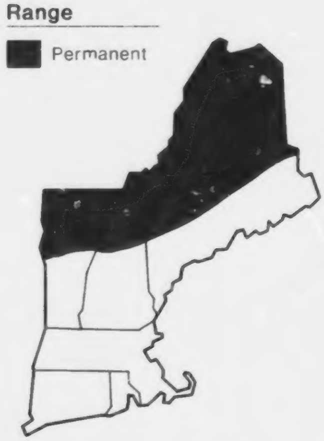
COMMENTS: Birds are highly sedentary and may remain on home range for life. Females tend to feed lower on different species of trees than males and forage by different technique (Kilham 1965, 1968a), a behavior that lessens competition.

KEY REFERENCES: Bent 1939, Conner et al. 1975, Graber et al. 1977, Kilham 1960, Lawrence 1967.

Three-toed Woodpecker
(Picoides tridactylus)

A.O.U. No. 401.0





RANGE: Breeding: Northern edge of Canadian boreal forest s. to n. New England, Arizona, and New Mexico. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare.

HABITAT: Breeding: Coniferous forests, especially where fires have left large stands of dead timber. Also favors logged areas and swamps with scattered dead trees.

SPECIAL HABITAT REQUIREMENTS: Trees with a minimum d.b.h. of 12 inches (30.5 cm) for nesting (Thomas et al. 1979).

NESTING: Egg dates: May 14 to June 14, New York (Bull 1974:363). Clutch size: Typically 4. Incubation period: About 14 days. Broods per year: 1. Nest height: 5 to 12 feet (1.5 to 3.7 m), rarely to 40 feet (12.2 m). Nest site: A cavity in a living or dead tree, often in a burned stand. Loosely colonial in areas with abundant food.

FORAGING: Major foods: Wood-boring larvae of moths and beetles, cambium. Substrates: Trunks of trees (bark crevices). Short (1974) observed birds in New York feeding mainly in the upper parts of live conifers. Techniques: Probing bark, drilling.

COMMENTS: Birds are sedentary, rarely leave home ranges. Seldom venture far from deep woods. Diet is greater than 90 percent animal matter and less than 10 percent vegetable matter. 75 percent of the animal portion consists of wood boring larvae (Bent 1939:118).

KEY REFERENCES: Bent 1939, Harrison 1975, Short 1974.

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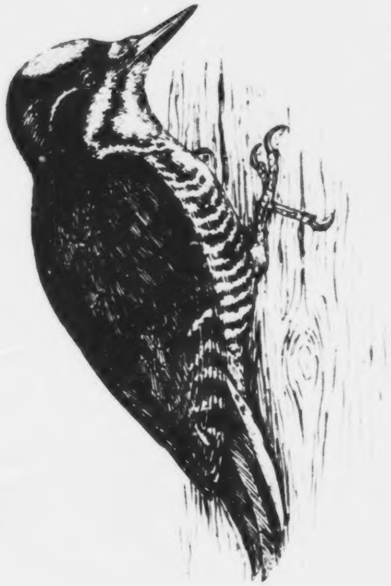
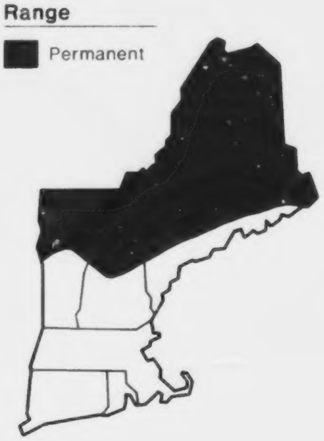
Black-backed Woodpecker

(Picoides arcticus)

A.O.U. No. 400.0





RANGE: Breeding: Newfoundland, w. to c. Alaska, s. to n. New England, nw. Wyoming and c. California. Winter: Same as breeding range, occurs irregularly s. to s. New England, Long Island, and n. New Jersey.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Coniferous forests, especially where burned or logged where swampy conditions predominate. Favors spruce-fir and larch. Also prefers large tracts of balsam fir killed by spruce-budworm. Wintering: Same as breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Dead trees with loose bark for feeding. Trees with a minimum d.b.h. of 12 inches (30.5 cm) for nesting (Thomas et al. 1979).

NESTING: Egg dates: May 18 to June 12, New York (Bull 1974:360). Clutch size: 2 to 6, typically 4. Incubation period: About 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 2 to 15 feet (0.6 to 4.6 m). Usually excavates a new cavity each year as part of courtship activity, as well as for roosting. Nest site: Excavates a cavity in a living tree with a decayed interior or a dead tree or stub (often balsam fir). Sometimes used old utility poles. Birds in New York nested in small open areas with windfalls and dead trees (Bent 1939:106). Birds in New York almost invariably nested in dead trees (Bull 1974:361).

FORAGING: Major foods: Bark-boring beetle larvae and other insects, cambium. Substrates: Under loose bark, decayed heartwood, crevices in bark, lower parts of dead trees. Techniques: Probing bark, scaling off loose bark, drilling. Preferred feeding habitat: Beaver swamps and other places where there are recently killed trees with loose bark. Short (1974) observed black-backs feeding mainly in dead trees bordering a bog.

COMMENTS: Bark-boring beetle larvae account for 75 percent of the volume of animal food. The remaining 25 percent consists of other insects and spiders, and plant materials.

KEY REFERENCES: Bent 1939, England 1940, Harrison 1975, Short 1974.

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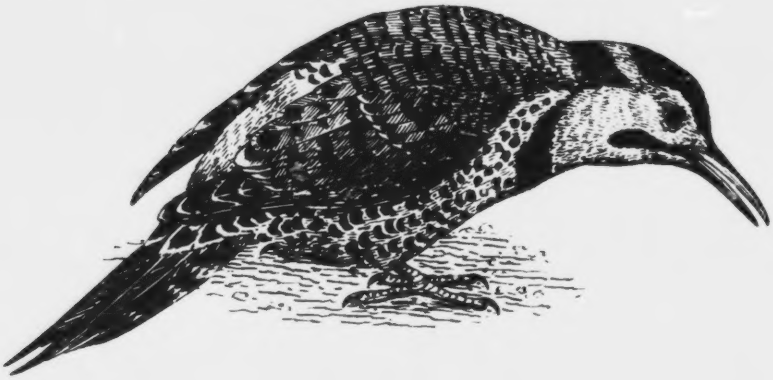
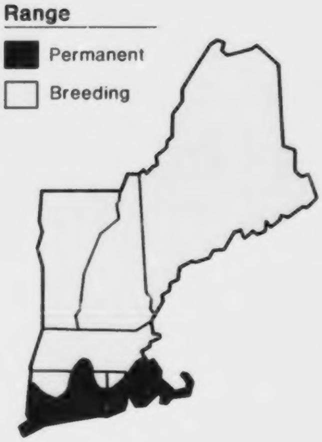
Northern Flicker

(Colaptes auratus)

A.O.U. No. 412.0





RANGE: Breeding: Labrador w. to Alaska (northern tree limit) s. to Florida, the Gulf Coast, and Central America. Winter: Central New England, w. to South Dakota, s. to the Gulf Coast.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Open deciduous, coniferous, or mixed woods, woodland edges (preferred), suburbs, farm woodlots, clearcuts in dense forests, fields, meadows. Wintering: Occasionally seeks protection from cold in coniferous woods or swamps.

SPECIAL HABITAT REQUIREMENTS: Medium to large dead or dying trees for nesting. Open areas for foraging. Trees 12 inches (30.5 cm) d.b.h. or more are most suitable for nesting (Thomas et al. 1979).

NESTING: Egg dates: April 20 to June 19, New York (Bull 1974:351). Clutch size: 3 to 10, typically 6 to 8. Incubation period: 11 to 12 days. Nestling period: About 23 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 2 to 60 feet (0.6 to 18.3 m). Typically 10 to 30 feet (3.0 to 9.1 m). Nest site: Cavity often near top of medium to large tree that is usually dead or dying. Flickers accept bird houses with proper dimensions and often use old vacant woodpecker holes. Nests in forests are usually located in snags near recent clearcuts. Forest edges or groves bordering fields are preferred nest sites.

TERRITORY SIZE: 1.55 acres (0.6 ha) in Illinois (Calef 1953 in Graber et al. 1977). Territorial defense is limited to nest site during the incubation period. During this period, other Flickers may occupy original territory (Kilham 1973). Kilham (1973) observed 3 pairs on less than one acre (0.4 ha).

SAMPLE DENSITIES: Average 33.3 birds per 100 acres (40 ha) in second growth hardwoods in Illinois (Fawks 1937, 1938 in Graber et al. 1977). 13 birds per 100 acres (40 ha) in oak-hickory type in Illinois (Franks and Martin 1967). 19 pairs per 100 acres (40 ha) in white pine woodland on Nantucket Island (Dennis 1969).

FORAGING: Major foods: Ants (staple) and a variety of other insects, especially ground beetles, crickets, and grasshoppers. Also commonly takes wild fruits. Substrates: (surface and depths not exceeding the length of the bird's bill), leaf litter, short grasses, bark, under surface of bark. Techniques: Probing, gleaning. Preferred feeding habitat: Grassy areas such as lawns, pastures, openings in woods, cornfields (especially in winter).

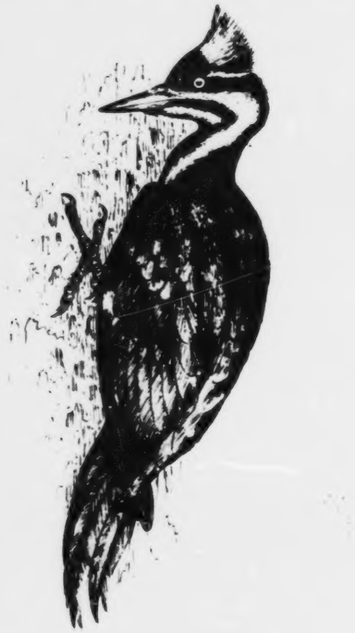
COMMENTS: Beal (1911 in Bent 1939:277) found that about 61 percent of the diet consisted of animal food and about 39 percent vegetable food. Ants represented about 75 percent of the volume of animal material.

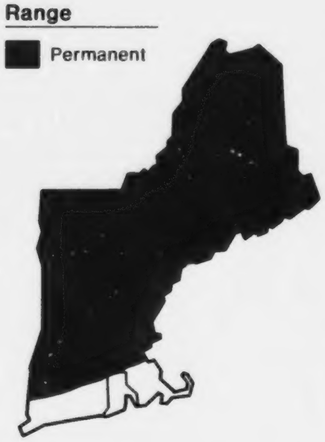
KEY REFERENCES: Bent 1939, Dennis 1969, Graber et al. 1977, Lawrence 1967.

Pileated Woodpecker

(Dryocopus pileatus)

A.O.U. No. 405.0





RANGE: Breeding: Southeastern Canada, nw. to Mackenzie district, Northwest Territories, s. to Florida and Texas. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Extensive second growth and mature coniferous, deciduous, or mixed forests, often in lowlands near rivers and wooded swamps; woodlots near farms and residential areas. Prefer areas with high basal area and high stem density (Conner et al. 1975). Wintering: Birds are permanent residents, generally remaining in breeding habitat year round (Hoyt 1941). Birds have recently been found breeding in city parks with large trees (Bull 1974:352).

SPECIAL HABITAT REQUIREMENTS: Mature forest with large dead or dying trees greater than 14.2 inches (36 cm) for nesting and feeding. Trees with heart rot that attract carpenter ants, a winter staple (Conner et al. 1975).

NESTING: Egg dates: April 22 to May 19, New York (Bull 1974:352). Clutch size: 3 to 4, typically 4. Incubation period: 18 days. Nestling period: 26 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 15 to 70 feet (4.6 to 21.3 m), typically 45 feet (13.7 m). Nest site: Cavity in trunk of dead or, less often, living tree; sometimes in large dead limbs, preferably near water. Conner and others (1975) found pileated nests in trees with a d.b.h. range of 13 to 35.8 inches (33 to 91 cm) (average 21.5 inches) 54.6 cm). They most often nested in trees 14.2 to 20.1 inches (36 to 51 cm) d.b.h. in oak-hickory woodland and favored trees with smooth trunks and fungal activity. Hoyt (1957) observed that they rarely reuse old nest holes.

SAMPLE DENSITIES: 3 birds per 100 acres (40 ha) in virgin bottomland forest in Illinois (Snyder et al. 1948). 3 birds per 100 acres (40 ha) in mature bottomland forest in Illinois (Graber et al. 1977). 0 to 0.5 birds per 100 acres (40 ha) in mature upland forest in Illinois (Graber et al. 1977). 1 pair per 1,643 acres (665 ha) in ponderosa pine, Douglas-fir, and larch habitat in Oregon (Bull 1975). Maximum 1 pair per 98.8 acres (40 ha) (Hardin and Evans 1977).

FORAGING: Major foods: Larvae and adults of many kinds of insects, especially ants, which account for more than 50 percent of the diet. Also eats wild fruits, acorns, beechnuts (Bent 1939:183). Substrates: Trunks, bark, branches, decayed heartwood of living and dead standing trees. Most feeding is done in decayed wood (Tanner 1942). Techniques: Drilling, gleaning. Preferred feeding habitat: Feeding is restricted to forest interiors and, less commonly, edges (Bent 1939:184).

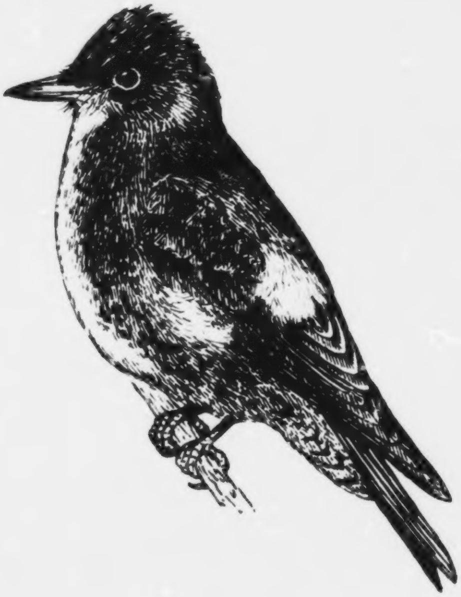
COMMENTS: Beal (1911 in Bent 1939:183) found that the contents of 80 stomachs contained 73 percent animal and 27 percent vegetable matter. The winter diet consists mainly of carpenter ants. Hoyt (1957) found that pileated woodpeckers have a feeding territory of 98.8 to 197.6 acres (40 to 60 ha).

KEY REFERENCES: Bent 1939, Bull 1975, Conner et al. 1975, Graber et al. 1977, Hoyt 1957.

Olive-sided Flycatcher

(Contopus borealis)

A.O.U. No. 459.0



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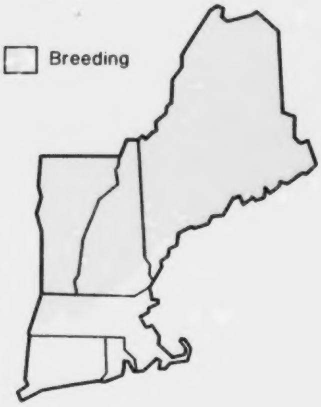


RANGE: Breeding: Newfoundland, w. to Alaska, s. in mountains to Pennsylvania, Wisconsin, Arizona, and s. California. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Coniferous (spruce) forests near edges and clearings, often along wooded streams and borders of northern bogs and muskegs, burned-over areas with a few dead trees for perches. Prefers to be near water.

NESTING: Egg dates: June 9 to June 27, New York (Bull 1974:378). Clutch size: 2 to 4, typically 3. Incubation period: 16 to 17 days. Nestling period: About 23 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 5 to 50 feet (2.1 to 15.2 m). Nest site: Usually well hidden on a horizontal branch high in a conifer, usually far out from the trunk.

TERRITORY SIZE: Breeding birds require an area of several acres (Harrison 1975:127).

FORAGING: Major foods: Insects, especially hymenopterans. Substrates: Air, surfaces of leaves. Techniques: Hawking, flight-gleaning.

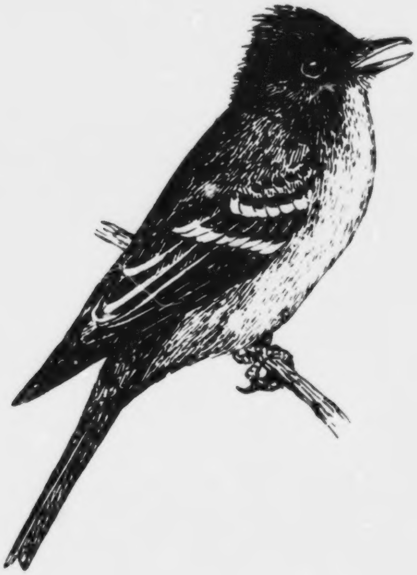
COMMENTS: Typically perches in tree tops and on high, exposed (often) dead limbs for hawking.

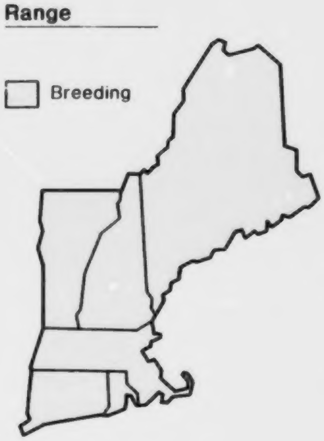
KEY REFERENCES: Bent 1942.

Eastern Wood-Pewee

(Contopus virens)

A.O.U. No. 461.0





RANGE: Breeding: Nova Scotia w. to s. Manitoba, s. to Florida and Texas. Winter: Central and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Interiors and edges of deciduous and coniferous forests, bottomlands, uplands, farm woodlots, roadsides, parks. Seems to be strongly associated with oaks (Graber et al. 1974), but occurs in more northern forests as well. Probably requires predominance of hardwoods.

NESTING: Egg dates: May 30 to July 20, New York (Bull 1974:378). Clutch size: 2 to 4, typically 3. Incubation period: 12 to 13 days. Nestling period: 15 to 18 days. Broods per year: 1, possibly 2. Nest height: 9 to 65 feet (2.7 to 19.7 m), typically 25 feet (7.6 m). Nest site: Typically saddled on horizontal limb of tree usually far from trunk. Sometimes on dead limb of living tree.

TERRITORY SIZE: 1.4 to 3.1 acres (0.6 to 1.3 ha) in lowland forest in Illinois (Fawver 1947 and Calef 1953 in Graber et al. 1974).

HOME RANGE: 10.8 acres (4.4 ha) Odum and Kuenzler 1955).

SAMPLE DENSITIES: Maryland — 19 pairs per 100 acres (40 ha) in virgin hardwood forest. 7 pairs per 100 acres (40 ha) in unsprayed apple orchard. 6 pairs per 100 acres (40 ha) in upland oak forest. 5 pairs per 100 acres (40 ha) in pine-oak forest (Stewart and Robbins 1958:207).

FORAGING: Major foods: Insects. Substrates: leaf surfaces, air. Techniques: Hawking, flight-gleaning, gleaning. Preferred feeding habitat: Woodland clearings, edges of fields, marshes; generally feeds in mid to lower tree canopy.

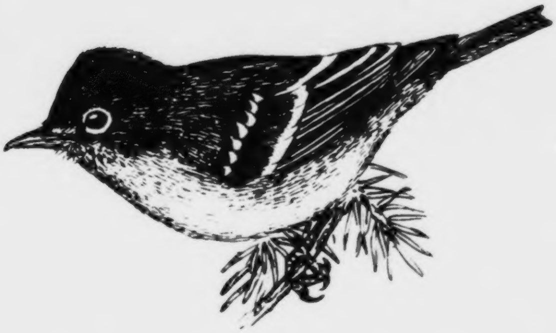
COMMENTS: Wood-Pewees occur in deciduous woodlands with relatively open understories. The nests are usually associated with openings. They will nest in a forest with a dense understory if canopy above is incomplete or sparse.

KEY REFERENCES: Bent 1942, Graber et al. 1974, Johnston 1971.

Yellow-bellied Flycatcher

(Empidonax flaviventris)

A.O.U. No. 463.0



Range
☐ Breeding

RANGE: Breeding: Newfoundland, w. to s. Mackenzie district, Northwest Territories, s. to n. New England, n. Pennsylvania (rarely) and c. Alberta. Winter: Mexico and Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine).

HABITAT: Breeding: Coniferous forests; low, wet, swampy thickets bordering ponds, streams and bogs, spruce and alder swamps, cool moist mountainsides.

SPECIAL HABITAT REQUIREMENTS: Coniferous forests, low wet areas.

NESTING: Egg dates: June 10 to June 27, New York (Bull 1974:371). Clutch size: 3 to 5, typically 3 or 4 (Harrison 1975:121). Incubation period: 15 days. Nestling period: 13 days. Age at sexual maturity: 1 year. Nest site: On or near the ground, sometimes at the base of a tree in a cavity formed by roots, but more often beside a hummock or mound and well hidden in sphagnum moss or other vegetation.

FORAGING: Major foods: Flying insects, fruits (occasionally). Substrate: Air. Technique: Hawking.

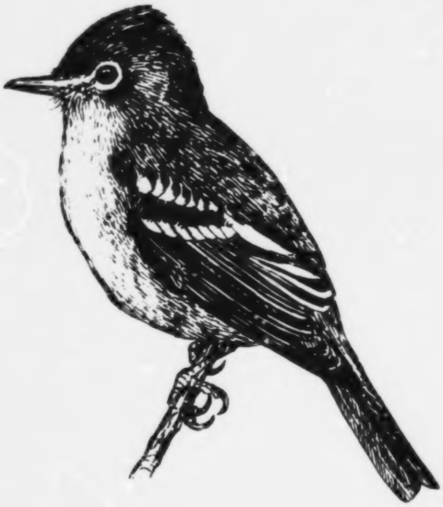
COMMENTS: Birds perch and feed close to ground. Food habit studies indicate a predominance of animal food (97 percent) over vegetable food (3 percent) (Beal 1912 in Bent 1942:178).

KEY REFERENCES: Bent 1942, Walkinshaw 1957.

Acadian Flycatcher

(Empidonax virescens)

A.O.U. No. 465.0



Range
Breeding

RANGE: Breeding: Most of e. North America, including ne. Pennsylvania, sw. and se. New York and casually to s. New England. Winter: Costa Rica to n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Deciduous woodlands, shaded ravines, heavily wooded bottomlands, river swamps, hammocks of cypress ponds (Harrison 1975:122).

NESTING: Egg dates: April to July. Clutch size: Usually 2 to 4. Incubation period: 13 to 14 days. Nestling period: 13 to 15 days (Newman 1958). Broods per year: 1. Age at sexual maturity: 1. Nest height: 8 to 20 feet (2.4 to 6 m).

NEST SITE: Usually suspended in hammock-like structure from the fork of a branch frequently near water (Godfrey 1979:255). Nests are often far out from the truck and shaded (Harrison 1975:122).

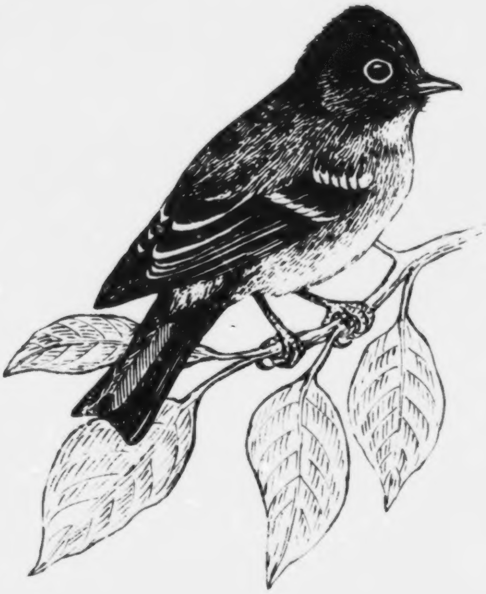
FORAGING: Major foods: Moths, caterpillars, beetles, wasps, bees, and some wild berries (Terres 1980:381). Substrate: Air. Technique: Sallier.

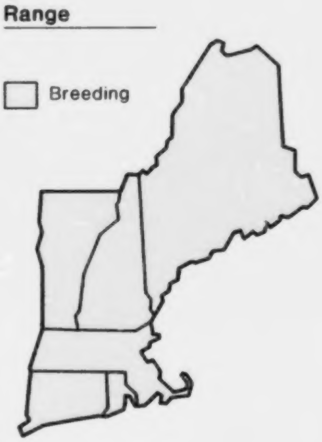
KEY REFERENCES: Godfrey 1979, Harrison 1975, Mumford 1964.

Alder Flycatcher

(Empidonax alnorum)

A.O.U. No. 466.3





RANGE: Breeding: Newfoundland, w. to Alaska, s. to e. and n. Pennsylvania, c. Minnesota and c. British Columbia. Winter: Central and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon (s. New England).

HABITAT: Breeding: Low, damp thickets bordering bogs, swamps and marshes. Often in alders, willows, elders, sumacs, viburnums. Prefers open areas.

SPECIAL HABITAT REQUIREMENTS: Areas with dense, low shrubs and clearings (edges).

NESTING: Egg dates: June 11 to July 29, New York (Bull 1974:376). Clutch size: 3 to 4. Incubation period: 12 to 14 days. Nestling period: 13 to 16 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 1 to 6 feet (0.3 to 1.8 m), typically 3 to 4 feet (0.9 to 1.2 m). Nest site: In low tree or shrub saddled on a branch or in an upright fork.

TERRITORY SIZE: Singing males of three separate populations had average territory sizes of 3.2, 3.8, 7.7 acres (1.2, 1.5, 3.1 ha) (Stein 1958).

FORAGING: Major foods: Flying insects. Substrate: Air. Techniques: Hawking, flight gleaning.

KEY REFERENCES: Bent 1942, King 1955, Stein 1958.

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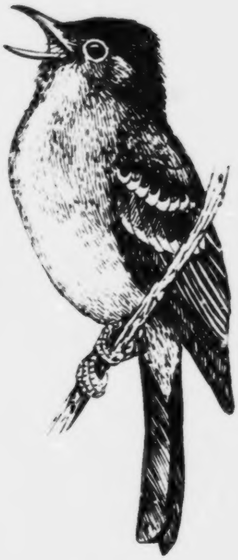
Willow Flycatcher

(Empidonax traillii)

A.O.U. No. 466.4



Range
Breeding

RANGE: Breeding: Southern Main, w. to British Columbia, s. to n. Virginia, c. Arkansas and s. New Mexico. Winter: Central and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Prefers open, newly clearcut areas, damp to dry brushy fields, woodland edges, hedgerows, roadsides, and orchards. Frequents uplands and lowlands.

SPECIAL HABITAT REQUIREMENTS: Low trees and shrubs with clearings (edges).

NESTING: Egg dates: June 11 to July 29, New York (Bull 1974:376). Clutch size: 3 to 5, typically 3 or 4. Incubation period: 12 to 15 days. Nestling period: 15 to 18 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 3 to 25 feet (1.0 to 7.6 m). Typically 4 to 6 feet (1.2 to 1.8 m). Nest site: In a fork or saddled on a horizontal limb of a shrub, commonly willow, elder, viburnum, hawthorn, and others.

TERRITORY SIZE: 0.8 to 2.9 acres (0.3 to 1.2 ha) (average 1.74 acres (0.7 ha) for 73 territories in a dry marsh in Michigan (Walkinshaw 1966b). Singing males of three separate populations had average territory sizes of 2.6, 3.2, and 4.5 acres (1.1, 1.3, and 1.8 ha) (Stein 1958).

SAMPLE DENSITIES: 25 to 30 pairs per square mile (10 to 11 pairs/km^2) in willow clump habitat in Illinois (8 to 9 birds per 100 acres (40 ha)) (Ford 1956 in Graber et al. 1974).

FORAGING: Major foods: Flying insects. Substrate: Air. Techniques: Hawking, flight gleaning.

COMMENTS: Difficult to distinguish from Alder Flycatcher (both formerly Traill's) even when in hand. Most widely accepted diagnostic characteristic is voice difference: Willow — "fitź-bew", Alder — "fee-beé-o".

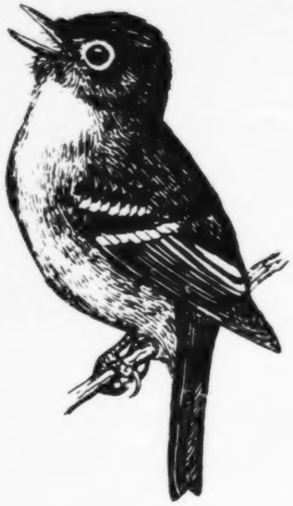
KEY REFERENCES: Graber et al. 1974, King 1955, Stein 1958, Walkinshaw 1966b.

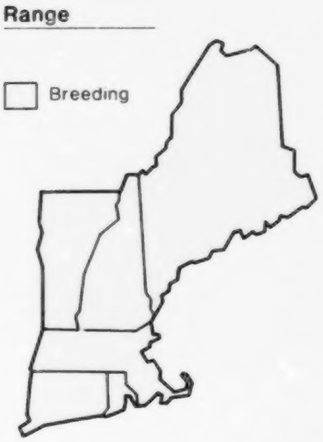
BEST COPY AVAILABLE

Least Flycatcher

(Empidonax minimus)

A.O.U. No. 467.0





RANGE: Breeding: Nova Scotia to Mackenzie district, Northwest territories, s. to Long Island and central New Jersey and the mountains of Georgia, w. to Wyoming and British Columbia. Winter: Mexico and Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Deciduous forest edges, burns and clearings, open shrublands, orchards, well-planted residential areas, edges of country roads, overgrown pastures and open deciduous woodlands.

SPECIAL HABITAT REQUIREMENTS: Open deciduous forest, edge (shade for nest and open space for feeding), moderately vegetated woodlands (intermediate openness in understory) (Breckenridge 1956).

NESTING: Egg dates: May 16 to July 28. New York (Bull 1974:377). Clutch size: 3 to 6, typically 3 or 4. Incubation period: About 14 days. Nestling period: 14 to 16 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 2 to 60 feet (0.6 to 18.3 m), typically 10 to 20 feet (3.0 to 6.1 m). Nest site: In crotch or on limb of deciduous or coniferous tree. Known to nest in apple, oak, pine, willow, sugar maple, and others.

TERRITORY SIZE: 0.35 to 0.55 acre (0.1 to 0.2 ha) in oak-chestnut woodland in Virginia (Davis 1959). 0.03 to 0.5 acre (0.01 to 0.2 ha) (average 0.18 acre (0.07 ha)) in Michigan for 33 territories (MacQueen 1950). Usually less than 1 acre (0.4 ha) (Breckenridge 1956).

SAMPLE DENSITIES: 2 nests per 27.67 acres (11.2 ha) of residential woodland in Illinois (Beecher 1942 in Graber et al. 1974). 9 nests per 19 acres (7.7 ha) in Virginia (Davis 1959) — oak-chestnut woodland. 2.7 pairs per acre (0.4 ha) in aspen-birch-maple habitat in Michigan (MacQueen 1950).

FORAGING: Major foods: Flying insects. Substrate: Air. Techniques: Hawking, flight-gleaning, gleaning.

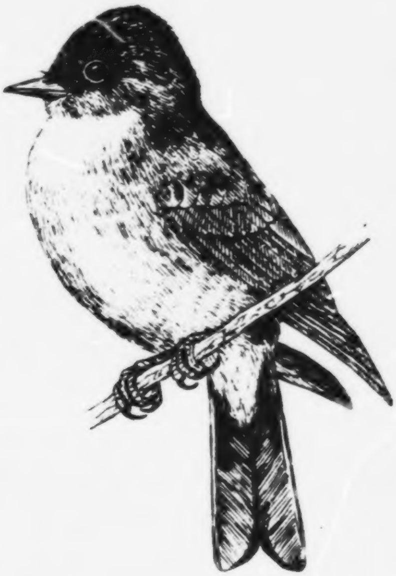
COMMENTS: Food studies have shown that Least Flycatchers eat 98 percent animal and 2 percent vegetable material in summer (Beal 1912 in Bent 1942:218).

KEY REFERENCES: Bent 1942, Breckenridge 1956, Graber et al. 1974, MacQueen 1950.

Eastern Phoebe

(Sayornis phoebe)

A.O.U. No. 456.0



Range
☐ Breeding

RANGE: Breeding: Nova Scotia, w. to Alaska, s. to n. Georgia (mountains) and e. New Mexico. Winter: Maryland s. Rarely to s. New England (coast) and Long Island.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Woodland cliffs, ravines, agricultural and suburban areas, often near streams.

SPECIAL HABITAT REQUIREMENTS: Perches 5 to 15 feet (1.5 to 4.6 m) high. Cliffs or ledges at stream-side clearings or man-made structures at forest openings (Hespenheide 1971).

NESTING: Egg dates: April 20 to August 4, New York (Bull 1974:369). Clutch size: 3 to 8, typically 5. Incubation period: 15 to 17 days. Nestling period: 15 to 17 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: 2.5 to 20 feet (0.8 to 6.1 m), typically less than 15 feet (4.6 m). Nest site: On a ledge, usually sheltered above by an overhang, often under leaves or on window ledges, barn beams, bridge girders. Nest is frequently near water. Birds are very adaptable in nesting habits.

TERRITORY SIZE: 3.3 to 7.1 acres (1.3 and 2.9 ha) for 2 pairs nesting on buildings in Kansas (Fitch 1958). 0.7 acre (0.3 ha) in an Illinois floodplain forest (Fawver 1947 in Graber et al. 1974).

SAMPLE DENSITIES: 6 nests per 30 acres (12.1 ha) in optimum habitat in Illinois (Graber et al. 1974). 7 pairs per 100 acres (40 ha) in mixed agricultural habitats in Maryland. 0.6 pairs per 100 acres (40 ha) in mixed forests and fields in Maryland (Stewart and Robbins 1958:201).

FORAGING: Major foods: Flying insects, occasionally small fruits. Substrate: Air. Technique: Hawking.

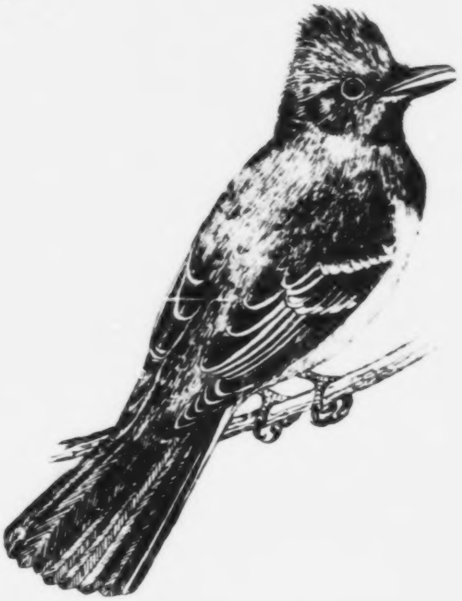
COMMENTS: Phoebes usually choose one or more favorite perches from which to hawk insects. They are common victims of cowbird parasitism. Blocher (1936) reported parasitism in 50 percent of the nests observed in Illinois. This species benefits from forest cuttings, moving into areas where cuttings have exposed ledge and rocks and creating sunny forest openings in the vicinity of ledge.

KEY REFERENCES: Bent 1942, Graber et al. 1974, Hespenheide 1971.

Great Crested Flycatcher

(Myiarchus crinitus)

A.O.U. No. 452.0



Range
☐ Breeding

RANGE: Breeding: New Brunswick w. to se. Manitoba, s. to Florida and Texas. Winter: Southern Florida and s. Texas to n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Edges of deciduous or mixed woodlands, swamps, old orchards (with dead limbs or trees), woodland clearings, sometimes along sides of ravines, deep forests. Prefers forests with mature trees but also uses second-growth woodlands.

SPECIAL HABITAT REQUIREMENTS: Cavity for nesting (middle-aged to mature trees), deciduous forest, edge.

NESTING: Egg dates: May 22 to July 11, New York (Bull 1974:338). Clutch size: 4 to 8, typically 5 or 6. Incubation period: 13 to 15 days. Nestling period: 12 to 13 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 3 to 75 feet (0.6 to 22.9 m), typically 10 to 20 feet (3.0 to 6.1 m). Nest site: In a cavity in a live or dead tree; accepts nest boxes. Uses natural cavities or abandoned woodpecker holes.

TERRITORY SIZE: 0.6 to 4.6 acres (0.2 to 1.9 ha) (average 3.1 acres (1.3 ha)) for 26 territories in Illinois (Fawver 1947 in Graber 1974). 4 to 8 acres (1.6 to 3.2 ha) (Stewart and Robbins 1958). 7.2, 6.6, 5.6 acres (2.9, 2.7, 2.3 ha) in forest-field edge habitat in Kansas (Fitch 1958).

SAMPLE DENSITIES: 50 birds per 100 acres (40 ha) in suburban habitats in Illinois (Ridgeway 1915). 8 pairs per 100 acres (40 ha) in mixed oak forest in Maryland. 7 pairs per 100 acres (40 ha) in dense second-growth oak-maple in Maryland. 4 pairs per 100 acres (40 ha) in hedgerows and active and abandoned farmland in Maryland (Stewart and Robbins 1958:200).

FORAGING: Major foods: Flying insects, insect larvae, fruits. Substrates: Air, crevices in bark of trees, cracks in fallen logs, leaf surfaces. Techniques: Hawking, gleaning, hover-gleaning. Preferred feeding habitat: Birds spend much time foraging in forest canopy.

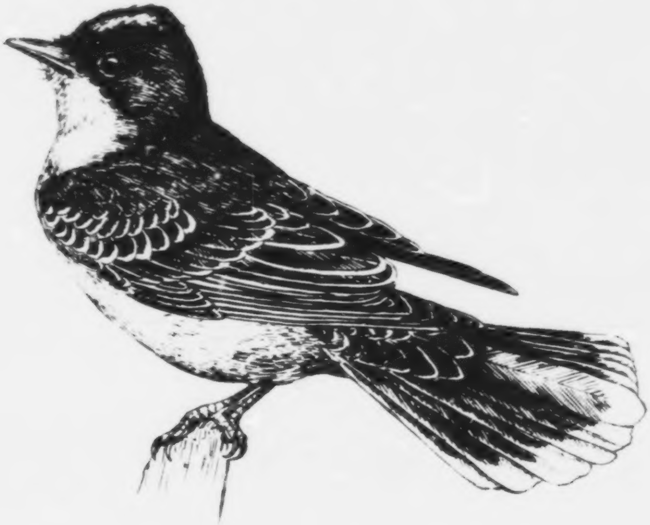
COMMENTS: High foraging (canopy) is more prevalent with interior woodland nesters than with edge nesters. Stomach analyses of 265 birds revealed a diet of 94 percent animal and 6 percent vegetable matter (Beal 1912 in Bent 1942:115). Originally a bird of forest interiors, this flycatcher has broadened its habitat to include more open areas and forest edges (Bent 1942).

KEY REFERENCES: Allen 1933a, Bent 1942, Graber et al. 1974, Mousley 1934.

Eastern Kingbird

(Tyrannus tyrannus)

A.O.U. No. 444.0



Range
Breeding

RANGE: Breeding: New Brunswick, w. to sw. British Columbia, s. to Florida, New Mexico, and Oregon. Winter: Central and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Frequently in orchards, pastures, and shrubby borders, forest edges, along fields and highways, near streams with shrubby banks, swamps or marshes with dead stumps and snags, sometimes in open woodlands.

SPECIAL HABITAT REQUIREMENTS: Open situations, perches for flycatching.

NESTING: Egg dates: May 22 to July 16, New York (Bull 1974:364). Clutch size: 3 to 6, typically 3. Incubation period: 12 to 13 days. Nestling period: 13 to 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 2 to 60 feet (0.6 to 18.3 m), typically 10 to 20 feet (3.0 to 6.1 m). Nest site: Usually on a tree limb quite far from trunk and often over water. Less commonly nests in a crotch or on top of dead stub. Apple is a preferred nest tree.

TERRITORY SIZE: 14 to 35 acres (5.7 to 14.2 ha) (4 pairs) (Odum and Kuenzler 1955).

SAMPLE DENSITIES: Approximately 2 to 9 birds per 100 acres (40 ha) in suitable habitat in Illinois (Graber et al. 1974). 36 pairs per square mile (4 pairs/km^2) (maximum density) in North Dakota (Stewart and Kantrud 1972). 10 pairs per 100 acres (40 ha) in residential-orchard-lawn habitat in Maryland (Stewart and Robbins 1958:198).

FORAGING: Major foods: Flying insects (staple), wild fruits; consumes over 200 kinds of insects and more than 40 kinds of fruits (Bent 1942). Substrate: Air. Techniques: Hawking, hovering, flight-gleaning; birds seem to have favorite hawking perches. Preferred feeding habitat: Over open land or water.

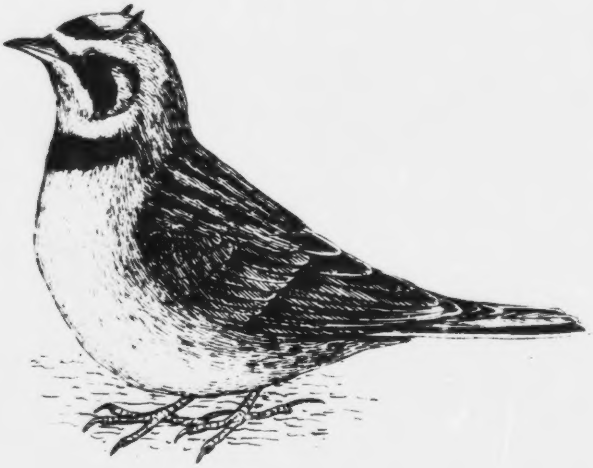
COMMENTS: Brewer (1958) found kingbirds nesting in young successional growth (6 to 20 years old) rather than older stands in strip-mining areas. Smith (1966) noted Kingbirds nesting in forested regions with internal clearings and extensive burned areas with standing trees.

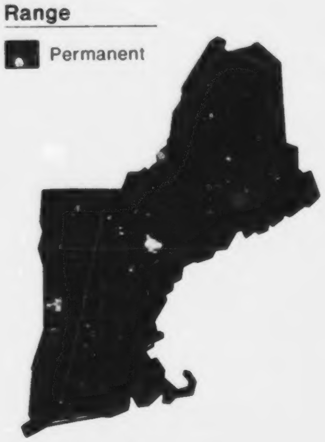
KEY REFERENCES: Bent 1942, Graber et al. 1974, Johnston 1971.

Horned Lark

(Eremophila alpestris)

A.O.U. No. 474.0





RANGE: Breeding: Arctic North America, s. to n. South America. Winter: News Brunswick, w. to n. Minnesota and s. British Columbia, s. to Mexico and the Gulf States (rarely).

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common in summer and winter.

HABITAT: Breeding: Plowed fields and large open areas with closely cropped grasses, golf courses, athletic fields, cemeteries, airports, seashore. Prefers areas with a minimum of vegetation. Absent from wooded areas and high mountains. Wintering: Similar to breeding habitat. Concentrates on snowless wind-swept areas near coast where food is more accessible.

SPECIAL HABITAT REQUIREMENTS: Bare exposed earth within territory.

NESTING: Egg dates: February 28 to July 31, New York (Bull 1974:381). Clutch size: 3 to 5, typically 4. Incubation period: 11 days. Nestling period: 10 to 12 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest site: A hollow in ground, usually next to a tuft or dead of living grass or weeds. Nest is often paved with small pebbles along a portion of the rim.

TERRITORY SIZE: Approximately 0.8 ha (2 acres) on burned-over grassland in Evanston, Illinois (1 pair); 5.0 ha (approximately) in garden and grainfield for 1 pair in Ithaca, New York (Pickwell 1931:134). About 12 acres (4.9 ha) in field in Kansas (Fitch 1958).

SAMPLE DENSITIES: 6 pairs occupied 72 acres (29.1 ha) of field in Kansas (Fitch 1958). 160 pairs per square miles (6 pairs/km^2) (maximum density) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: Summer — mainly insects. Winter — seeds of grasses and weeds, waste grains. Substrates: Bare earth, short grasses, and weeds. Techniques: Gleaning, scratching, running and pausing and pecking. Preferred feeding habitat: Snowless barrens with abundant weed seeds in winter.

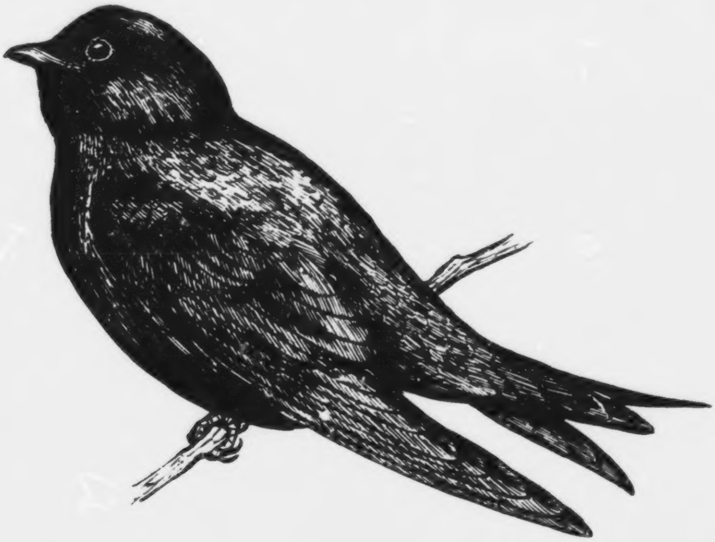
COMMENTS: Early eggs are occasionally destroyed by snowstorms. McAtee (1905 in Pickwell 1931:31) found that the vegetable portion of the diet taken in a year accounted for 79.4 percent of total. Birds are gregarious in winter.

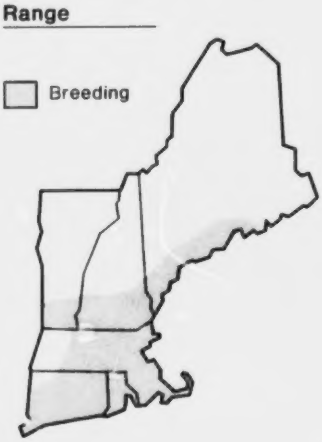
KEY REFERENCES: Bent 1942, Pickwell 1931, Sutton 1927.

Purple Martin

(Progne subis)

A.O.U. No. 611.0





RANGE: Breeding: Prince Edward Island, w. to s. British Columbia, s. to c. Mexico. Winter: Brazil.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common at local nest sites, rare elsewhere.

HABITAT: Breeding: Farmlands, parks, suburban yards, preferably near water.

SPECIAL HABITAT REQUIREMENTS: Large multi-roomed nest boxes, open space for foraging. May occasionally use natural cavities in trees.

NESTING: Egg dates: May 21 to July 13, New York (Bull 1974:390). Clutch size: 3 to 8, typically 4 or 5. Incubation period: 16 to 18 days. Nestling period: 26 to 31 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 15 to 20 feet (4.6 to 6.1 m). Nest site: Originally nested in cavities in trees; today nests almost exclusively in nest boxes, preferably near water. Birds favor large multi-roomed birdhouses set on poles 15 to 20 feet (4.6 to 6.1 m) high. Easily driven out of nest sites by starlings and house sparrows.

TERRITORY SIZE: Restricted to the nest cavity (Allen and Nice 1962).

SAMPLE DENSITIES: Colonies may consist of as many as 200 pairs (Bull and Farrand 1977).

FORAGING: Major foods: Flying insects. Substrate: Air. Techniques: Hawking, skimming water surface.

COMMENTS: In late summer, Martins gather in large flocks, often roosting in urban areas (Robbins et al. 1966) prior to their southward migration. Dependence on insects for food makes them vulnerable to starvation during long periods of cold, wet weather.

KEY REFERENCES: Allen and Nice 1952, Bent 1942, Finlay 1971.

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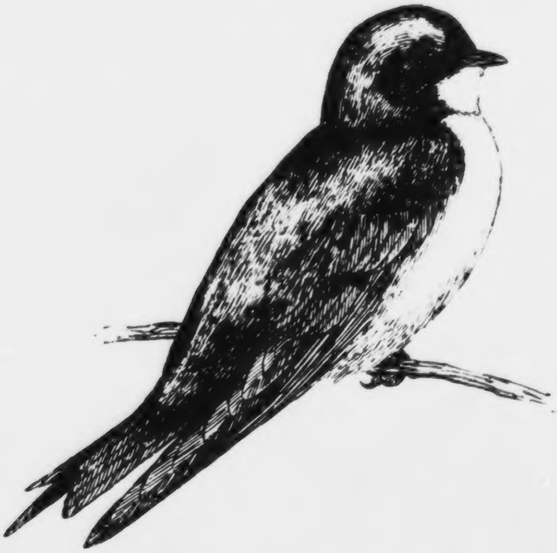
Tree Swallow

(Tachycineta bicolor)

A.O.U. No. 614.0



Range
☐ Breeding

RANGE: Breeding: Newfoundland w. to n. Alaska, s. to Maryland, Virginia, Colorado, and California. Winter: Coastal areas from Virginia, s. to Mexico, Central America and s. California. A few winter as far north as Long Island.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Breeding: Farmlands, river bottomlands, beaver ponds, wooded swamps or marshes with dead standing trees in or near water. Competition for suitable natural cavities in the Northeast has resulted in the heavy use of nest boxes. Wintering: Tidewater areas with bayberries.

SPECIAL HABITAT REQUIREMENTS: Cavity for nesting. Open feeding areas such as meadows, marshes, or water. The minimum d.b.h. of suitable nest trees is 10 inches (25.4 cm) (Thomas et al. 1979).

NESTING: Egg dates: May 5 to June 29, New York (Bull 1974:382). Clutch size: 4 to 7, typically 5 or 6. Incubation period: 13 to 16 days. Nestling period: 16 to 24 days (depending on food supply). Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 4 to 15 feet (1.2 to 4.6 m). Nest site: Natural cavity or old woodpecker hole in a trunk or dead limb of dead or living tree, holes in buildings, nest boxes. Is usually a solitary nester but may nest in small groups where suitable cavities abound and there is a good food supply. Prefers to nest over a body of water.

TERRITORY SIZE: Territory is restricted to the nest site (Kuerzl 1941).

SAMPLE DENSITIES: 40 occupied nest boxes in 28 acres (11.3 ha) of modified woodland in Illinois (Beecher 1942). Birds will nest within 7 feet (2.1 m) of each other in the presence of abundant food (Scott et al. 1977). Densities of up to 150 pairs per 0.3 ha (0.7 acres) are possible in nest boxes spaced no less than 2 m (6.6 feet) apart (Whittle 1926).

FORAGING: Major foods: Flying insects (summer), berries, and seeds are taken to supplement the winter diet when insects are less abundant. Substrates: Air, water. Techniques: Hawking, skimming water surface. Preferred feeding habitat: Over bodies of water.

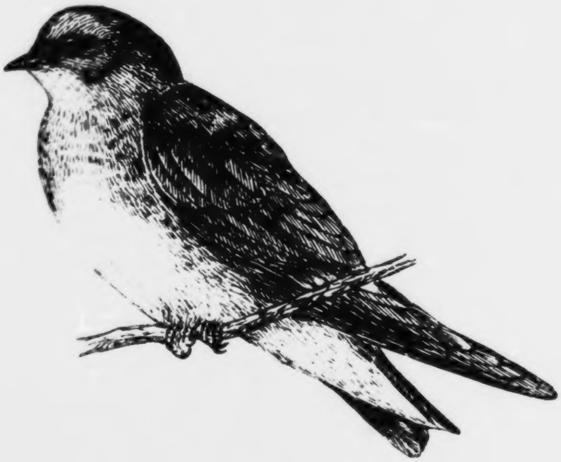
COMMENTS: The Tree Swallow's habit of eating bayberries enables it to return to the Northeast earlier in the spring, linger later in fall, and remain farther south in winter than other species of swallows. It commonly gathers in large coastal flocks in autumn.

KEY REFERENCES: Chapman 1955, Graber et al. 1972, Kuerzi 1941, Paynter 1954.

Northern Rough-winged Swallow

(Stelgidopteryx serripennis)

A.O.U. No. 617.0



Range
☐ Breeding

RANGE: Breeding: Maine to New Brunswick w. to British Columbia, s. to South America. Winter: Mexico to South America. Occasionally n. to coastal South Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Nearly any open area with adequate nest sites and a water supply (usually a stream). Often river valleys and lake shores.

NESTING: Egg dates: May 19 to July 5, New York (Bull 1974:385). Clutch size: 4 to 8, typically 6 or 7. Incubation period: 16 days. Nestling period: 20 to 21 days, to 30 days where food is scarce. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Solitary or semi-colonial nester (colonies usually consist of 2 to 6 pairs). Nests in burrows in sandy banks, often along a stream, irregation ditch, and less commonly in rock ledges, crevices in bridges and buildings, or drainage pipes under bridges. Often occupies abandoned bank swallow or Kingfisher holes.

TERRITORY SIZE: Territory is limited to the immediate vicinity of the nest entrance (Lunk 1962:29).

FORAGING: Major foods: Flying insects. Substrate: Air. Techniques: Hawking, skimming water surface.

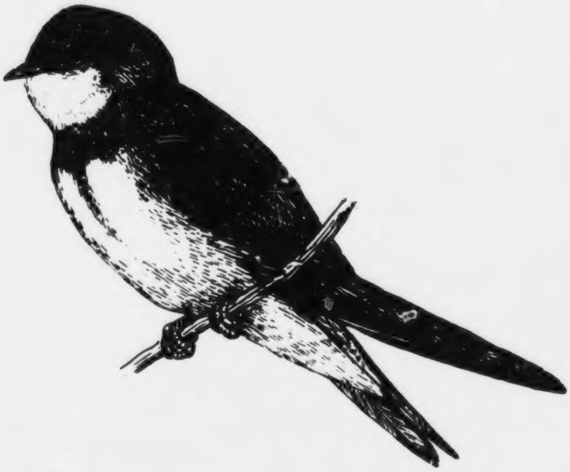
COMMENTS: Often one or a very few pairs of Rough-wings share a bank with Bank Swallows, especially along major water courses.

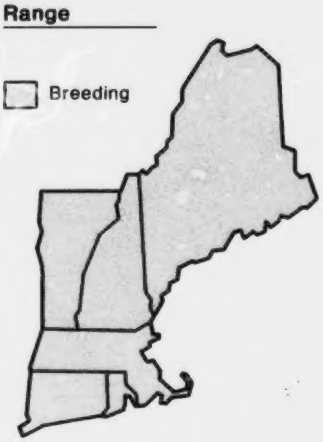
KEY REFERENCES: Bent 1942, Graber et al. 1972, Lunk 1962.

Bank Swallow

(Riparia riparia)

A.O.U. No. 616.0





RANGE: Breeding: Labrador, w. to Alaska, s. to Virginia and the Carolinas (mountains), s. Texas and s. California. Winter: South America, mainly in Brazil.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon depending on availability of nest sites.

HABITAT: Breeding: Riverbanks, gravel pits, road cuts, hardened sawdust piles, and clay banks. Prefers areas with grassland or cultivated fields at low elevations and near fresh water.

SPECIAL HABITAT REQUIREMENTS: Sand or clay banks that are stabilized by a grassy mat overhanging the top.

NESTING: Egg dates: May 15 to July 13 (second brood), New York (Bull 1974:383). Clutch size: 4 to 6, typically 5. Incubation period: 14 to 16 days. Nestling period: 18 to 22 days, to 30 days where food supply is limited. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: A burrow dug by both sexes usually near top of bank. Depth varies from 9 inches (22.9 cm) to 6 feet (1.6 m). Birds may restore existing burrows and form dense colonies where possible.

TERRITORY SIZE: Territory is restricted to the area immediately surrounding the nest site.

SAMPLE DENSITIES: Minimum spacing of nest holes in a Wisconsin study was 4 inches (10.2 cm). Most holes were 5 to 7 inches (12.7 to 17.8 cm) apart (Petersen 1955).

FORAGING: Major foods: Flying insects (nearly 100 percent of diet). Substrate: Air. Techniques: Hawking, skimming water surface. Preferred feeding habitat: Over water or grasslands, especially pastures.

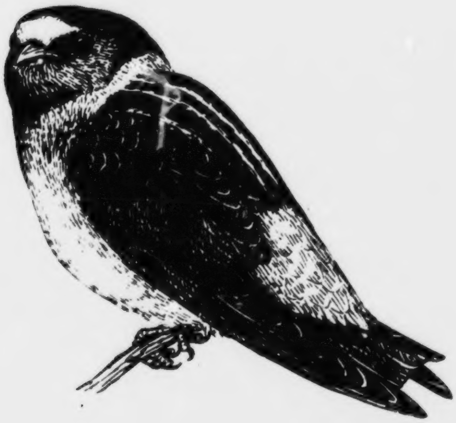
COMMENTS: Colonial feeding may be an adaptation that allows for more effective discovery of insect swarms. Birds typically nest in dense colonies of 10 to more than 300 nests. Nesting is synchronized — more than 70 percent of the young leave the nest within a 6-day period (Emlen and Demong 1974).

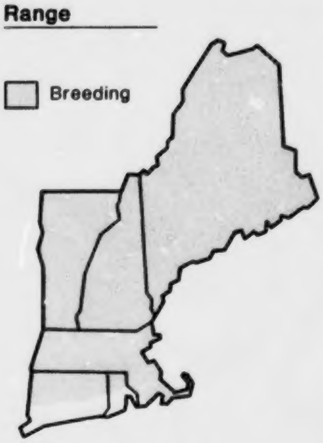
KEY REFERENCES: Bent 1942, Beyer 1938, Graber et al. 1972, Petersen 1955.

Cliff Swallow

(Hirundo pyrrhonota)

A.O.U. No. 612.0





RANGE: Breeding: Nova Scotia, w. to n. Alaska, s. to Virginia, Missouri and Central America. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Farmlands, villages, cliffs, bridges, dams, fresh or salt water areas, open forests.

SPECIAL HABITAT REQUIREMENTS: Open foraging areas, vertical wall with an overhang for nest attachment, mud for nest construction, fresh water with smooth surface for drinking. Nesting success is higher when house sparrows are controlled at colonies.

NESTING: Egg dates: May 9 to July 14, New York (Bull 1974:389). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 15 to 16 days. Nestling period: About 24 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest site: Nests colonally under bridges or dams, eaves, and interior of barns and sheds. Solitary nesting occasionally occurs.

TERRITORY SIZE: Restricted to the distance the bird can reach with bill from rim of nest (Emlen 1952).

SAMPLE DENSITIES: More than 100 nests have been counted at a single barn (Bull 1974:389).

FORAGING: Major foods: Flying insects make up nearly 100 percent of diet (Bent 1942:476). Substrate: Air. Techniques: Hawking, skimming water surface. Preferred feeding habitat: Often feed high in the sky (in excess of 100 feet) (30.5 m). Birds were seen feeding up to 4 miles (6.4 km) from nest site (Emlen 1954).

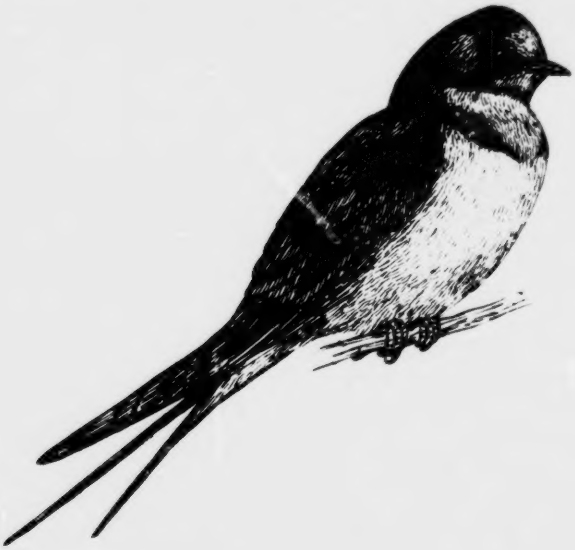
COMMENTS: Cliff and barn swallows may nest in the same barn, but competition is minimal because Cliff Swallows build near the entrance point and Barn Swallows nest deeper in the interior (Samuel 1971). Much of Cliff Swallow habitat has been usurped by House Sparrows.

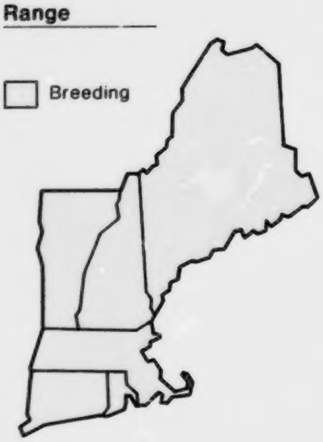
KEY REFERENCES: Emlen 1952, 1954; Graber et al. 1972, Mayhew 1958, Samuel 1971.

Barn Swallow

(Hirundo rustica)

A.O.U. No. 613.0





RANGE: Breeding: Labrador, west to Alaska, south to Georgia, Alabama, and Mexico. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Farmlands, rural and abundant areas.

SPECIAL HABITAT REQUIREMENTS: Man-made structures, especially buildings, for nesting. Open barns with suitable areas for nest construction on beams.

NESTING: Egg dates: May 11 to August 3, New York (Bull 1974:366). Clutch size: 4 to 6, typically 4 or 5. Incubation period: About 15 days. Nestling period: 16 to 23 days. Broods per year: 1 or 2 (at warmer latitudes). Age at sexual maturity: 1 year. Nest site: Nests inside sheds and barns (often in colonies), under bridges, culverts. Formerly nested on cliffs, in caves and in niches in rocks.

TERRITORY SIZE: Probably restricted to the nest site.

SAMPLE DENSITIES: Usually 6 to 8 nests per site is maximum, but as many as 55 nests have been reported in a single barn (Harrison 1975:132) and 63 at a Lunenburg, Massachusetts barn (Blodget, personal communication). 20 pairs per square mile (8 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 11 pairs per 100 acres (40 ha) in mixed agricultural and residential habitats including buildings (Stewart and Robbins 1958:214).

FORAGING: Major foods: Flying insects, occasionally takes fruits. Substrate: Air. Techniques: Hawking, skimming water surface. Preferred feeding habitat: Over ponds, lakes, rivers, and fields, seldom feeds more than 0.5 mile (0.8 km) from nest site (Samuel 1971).

COMMENTS: The diet consists almost entirely of animal matter (Bent 1942:450). Nearly all the food is taken on the wing. Swallows in Illinois spent much time feeding over edge shrub areas. Feeding densities averaged 26 birds per 100 acres (40 ha) (Graber et al. 1972).

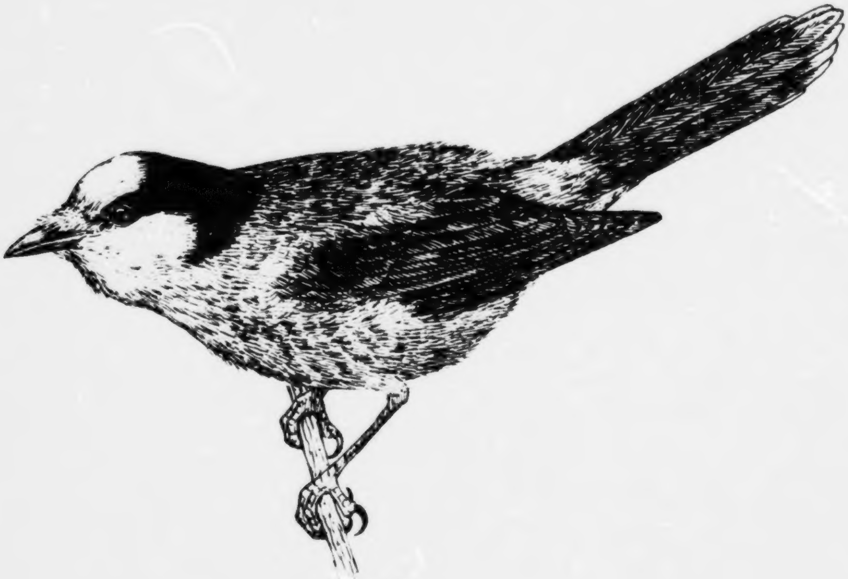
KEY REFERENCES: Bent 1942, Davis 1937, Graber et al. 1972, Samuel 1971.

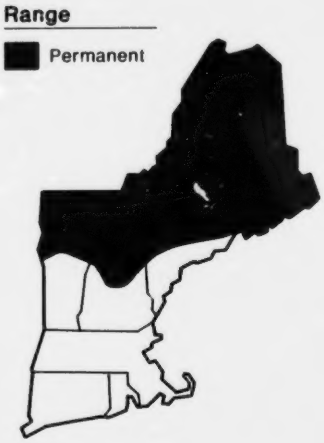
BEST COPY AVAILABLE

Gray Jay

(Perisoreus canadensis)

A.O.U. No. 484.0





RANGE: Breeding: Labrador, w. to n. Alaska, s. to n. New England, New York (Adirondacks), Michigan, and California. Winter: Same as breeding range, however, birds may wander as far s. as Pennsylvania and the s. Great Plains.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Coniferous forest and nearby deciduous or mixed woodlands. Coniferous swamps, wooded mountain slopes. Wintering: Birds wander but seldom move south of the breeding range. In mountainous areas, they commonly seek lower elevations.

SPECIAL HABITAT REQUIREMENTS: Coniferous forests.

NESTING: Egg dates: March to April (Goodwin 1976:250). Clutch size: 2 to 5, typically 3 or 4. Incubation period: 16 to 18 days. Nestling period: About 15 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 5 to 30 feet (1.5 to 9.1 m), typically 5 to 12 feet (1.5 to 3.7 m). Nest site: In solitary tree or clump of trees, usually conifers. Nest is often placed in crown of low tree or lower near trunk or branch tips and is usually well hidden.

FORAGING: Major foods: Insects, fruits, seeds, buds. Substrates: Leaf litter on ground, leaf and branch surfaces of trees and shrubs. Techniques: Gleaning.

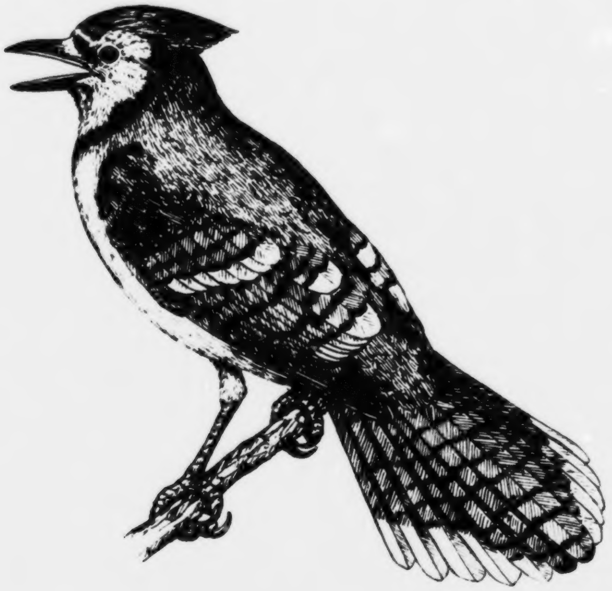
COMMENTS: Gray Jays cache food for future use.

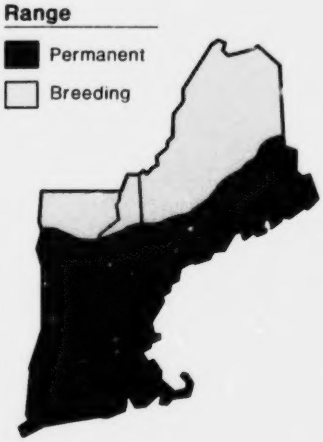
KEY REFERENCES: Bent 1946, Goodwin 1976, Lawrence 1947.

Blue Jay

(Cyanocitta cristata)

A.O.U. No. 477.0





RANGE: Breeding: Newfoundland w. to s. Alberta, s. to Florida and Texas. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Coniferous, deciduous, and mixed (preferred) woodlands representing a variety of forest types, wooded islands, farms, cities, suburbs, parks, and gardens. Prefers woodlands of oak, beech, and hickory. Wintering: Some northern birds move to more southern parts of breeding range (Goodwin 1976:263).

NESTING: Egg dates: April 28 to June 17, New York (Bull 1974:393). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 17 to 18 days. Nestling period: 17 to 21 days. Broods per year: 1 north, 2 south. Age at sexual maturity: 2 years (occasionally 1 year). Nest height: 5 to 50 feet (1.5 to 15.2 m), typically 10 to 25 feet (3.0 to 7.6 m). Nest site: Prefers to nest in conifer thickets in mixed woodlands. Also builds in deciduous trees, shrubs, and shrubs overrun with vines. Nest may be close to trunk of tree or well out on a horizontal limb.

TERRITORY SIZE: Territorial boundaries are not well defined (Goodwin 1976:267).

SAMPLE DENSITIES: 5 birds per 100 acres (40 ha) in well-defined floodplain forest in Maryland. 4 birds per 100 acres (40.5 h) in mixed-oak forest in Maryland (Stewart and Robbins 1958).

FORAGING: Major foods: Seeds, fruits, mast, occasionally takes insects, nestlings, young mice. Acorns are a staple food item throughout the year. Substrates: Ground (litter), tree tops, shrubs; birds feed at all levels in vegetation. Techniques: Hopping and gleaning.

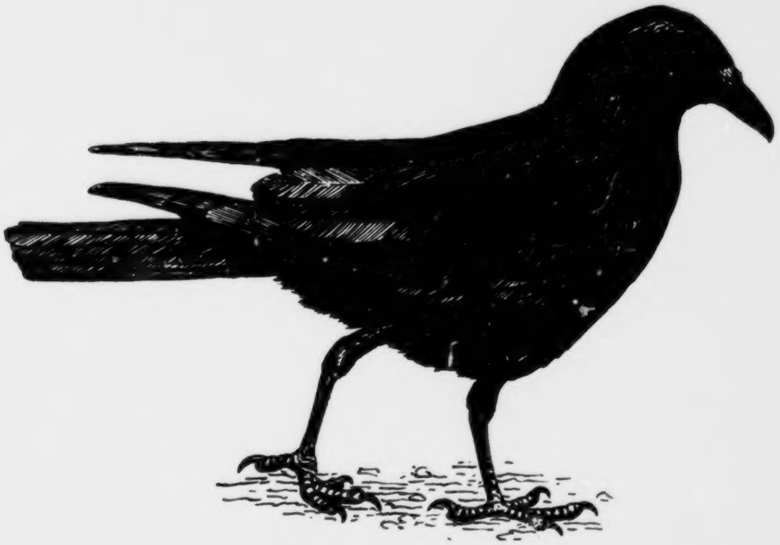
COMMENTS: Beal (1897 in Bent 1946:39) found that 76 percent of the annual diet (292 stomachs taken throughout the year) was vegetable matter and 24 percent was animal matter. Birds cache food in various places, possibly for winter use.

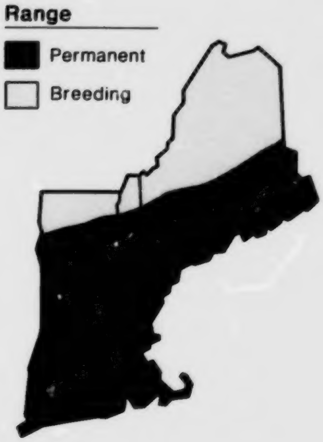
KEY REFERENCES: Bent 1946, Goodwin 1976.

American Crow

(Corvus brachyrhynchos)

A.O.U. No. 488.0





RANGE: Breeding: Newfoundland, w. to British Columbia, s. to Florida, the Gulf Coast and s. California. Winter: Southern Canadian Provinces, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Interior and edges of open deciduous, coniferous, and mixed forests and woodlots. Prefers woodland with adjacent farmland. Wintering: Large flocks often congregate in coastal areas where food is more accessible.

NESTING: Egg dates: March 30 to June 14, New York (Bull 1974:397). Clutch size: 3 to 8, typically 4 to 6. Incubation period: 18 days. Nestling period: About 25 days. Broods per year: 1 north, often 2 in south (Harrison 1975:139). Age at sexual maturity: 2 years. Nest height: 10 to 70 feet (7.6m). Nest site: Usually in crotch of tree near trunk or on a horizontal limb. Prefers to nest in conifers when available.

TERRITORY SIZE: Fitch (1958) found crows nonterritorial in Kansas and highly social in many activities.

SAMPLE DENSITIES: 0.6 pair per 100 acres (40 ha) in mixed woodland and farmland habitat in Maryland (Stewart and Robbins 1958). 4 pairs nested within a distance of 100 yards (91.4 m) in Kansas (Fitch 1958). 8 pairs per square mile (3 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

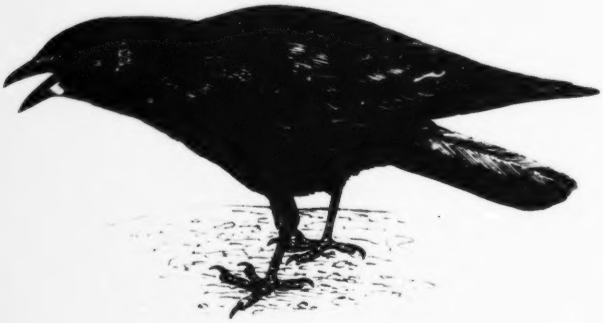
FORAGING: Major foods: Crows are omnivorous, taking mammals (mainly carrion), insects, small birds (nestlings), fruit, garbage, grain. Substrates: A variety of substrates. Techniques: Aerial searching, followed by quick descent to ground. Preferred feeding habitat: Cultivated grain fields.

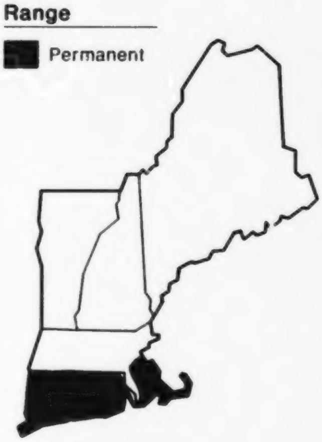
KEY REFERENCES: Bent 1946, Goodwin 1976, Johnston 1961.

Fish Crow

(Corvus ossifragus)

A.O.U. No. 490.0





RANGE: Breeding: Atlantic coast from Massachusetts s. to Florida, w. along the Gulf Coast to e. Texas. Winter: New York, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Low coastal areas especially wooded marine shorelines, coastal marshes and beaches and inland wetlands, especially along rivers affected by tides. Wintering: Same as breeding habitat.

NESTING: Egg dates: March 20 to June 5, New York (Bull 1974:399). Clutch size: 4 to 5. Incubation period: 17 to 18 days. Nestling period: About 21 days. Broods per year: 1. Age at sexual maturity: 2 years. Nest height: 20 to 80 feet (6.1 to 24.4 m), typically 50 feet (15.2 m). Nest site: Usually in small colonies in deciduous or coniferous trees.

SAMPLE DENSITIES: Colonies usually are made up of 2 to 4 pairs each nesting in a separate tree.

FORAGING: Major foods: Insects, grain wild fruits, aquatic organisms, birds' eggs, carrion. Substrates: Mud, sand, water, other birds' nests. Techniques: Hovering, followed by quick descent to food, ground-gleaning. Preferred feeding habitat: Tidal flats, beaches, rookeries, banks of brackish rivers.

COMMENTS: Also breeds in fertile farmland well inland from coast (100+ miles (16.0+ km)) in Pennsylvania and Maryland. Fish crows often feed and roost in large flocks with common crows.

KEY REFERENCES: Bent 1946, Forbush 1929, Goodwin 1976.

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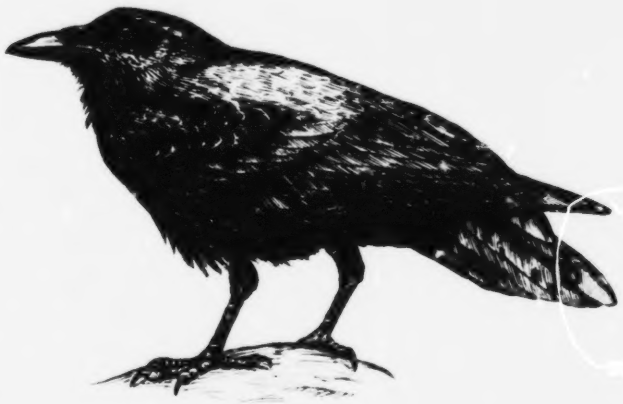
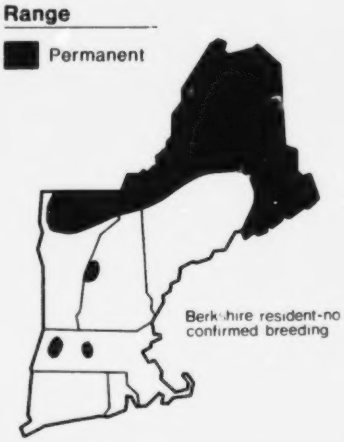
Common Raven

(Corvus corax)

A.O.U. No. 486.0





RANGE: Breeding: Northern North America, s. to coastal Maine, the Dakotas, and the mountains to Georgia and Central America. Local in Adirondack Mountains. Winter: Some birds move to more southern parts of breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine).

HABITAT: Breeding: Remote mountain forests, seacoasts, wooded marine islands. Prefers open woodlands, clearings; avoids extensive, dense forests. Wintering: Ravens commonly move toward the coast or to southern parts of breeding range where foods is more accessible. Lake shores, rivers banks, mud flats.

SPECIAL HABITAT REQUIREMENTS: Cliffs or tall trees for nesting.

NESTING: Egg dates: March 24 to April 29, Maine (Bent 1946:214). Clutch size: 3 to 6, typically 4 or 5. Incubation period: About 21 days. Nestling period: About 40 days. Broods per year: 1. Age at sexual maturity: Probably 3 or more years (Hooper and Dachelet 1976). Nest site: Usually on a cliff or high in a coniferous tree. Ravens in Virginia nested on cliffs with an overhang above and a steep rock face below. Nests were found as close as 0.5 mile (0.8 km) to human dwellings (Hooper 1977).

HOME RANGE: 2.6 to 4.2 square miles (6.7 to 10.9 km^2) (observed areas) in Wyoming (Craighead and Craighead 1969). Hooper (1977) observed ravens flying more than 1.2 miles (2 km) from nest sites.

SAMPLE DENSITIES: Nests are often spaced several miles apart (Harrison 1975). Hooper and others (1975) found ravens nesting as close as 2.2 km (1.4 miles) and with an average distance of 4.3 km (1.7 miles).

FORAGING: Major foods: Ravens are omnivorous, taking small to large mammals (carrion), birds, insects and plant material (Harlow et al. 1975). Substrates: Lake shores, mud flats (coast), forest floor. Technique: Scavenging. Preferred feeding habitat: Seabird colonies (coast), garbage heaps; highways (road kills).

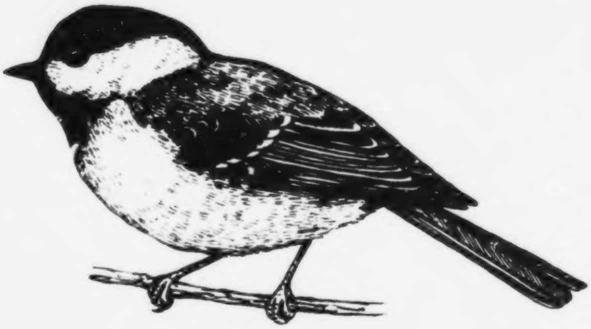
COMMENTS: Harlow and others (1975) found that medium to large mammals were the predominant food items taken in winter and spring in Virginia. They were apparently in the form of carrion supplied by road kills or natural mortality.

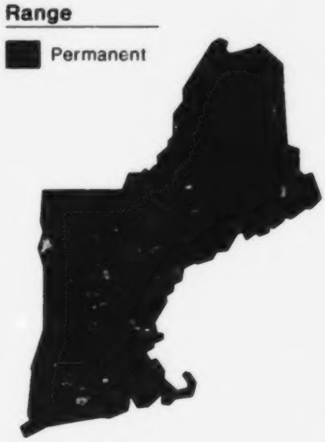
KEY REFERENCES: Bent 1946, Goodwin 1976, Harlow 1922, Hooper 1977, Murray 1940, Tyrrell 1945.

Black-capped Chickadee

(Parus atricapillus)

A.O.U. No. 735.0





RANGE: Breeding: Newfoundland, w. to c. Alaska, s. to North Carolina (mountains), n. New Mexico and n. California. Winter: Resident in breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Deciduous, coniferous, or mixed woodlands (mixed preferred). Frequents both heavily forested and residential areas. Wintering: Frequents city parks and residential areas with feeding stations adjacent to breeding habitat. Birds generally remain in breeding areas.

SPECIAL HABITAT REQUIREMENTS: Require dead standing trees (minimum d.b.h. 4 inches (10.2 cm)) for excavating cavities or trees with existing cavities for nesting (Thomas et al. 1979). Comparatively open situations (nesting) near deeper woods (feeding) (Odum 1941).

NESTING: Egg dates: April 29 to July 15, New York (Bull 1974:401). Clutch size: 5 to 10, typically 6 to 8. Incubation period: 12 to 13 days. Nestling period: About 16 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 1 to 50 feet (0.3 to 15.2 m), typically 4 to 10 feet (1.2 to 3.0 m). Nest site: In a cavity in a standing dead tree or stub, preferably birch, aspen, pin cherry, or other tree that undergoes rapid decay. Accepts nest boxes. Prefers stubs with firm shells and decayed interiors (Brewer 1961). Usually excavated in decaying wood. Rarely uses old woodpecker holes and natural cavities.

TERRITORY SIZE: Sizes ranged from 8.4 to 17.1 acres (3.4 to 6.9 ha) (average 13.2 acres (5.3 ha)) in different habitats (Odum 1941). 2.3 acres (0.9 ha) for 1 pair in Kansas (Fitch 1958).

HOME RANGE: Winter — approximately 21 to 55 acres (8.5 to 22.3 ha) (average 36 acres (14.6 ha)) in New York (Odum 1942:523). 19.1 acres (7.7 ha) in Kansas (Fitch 1958).

SAMPLE DENSITIES: Average 1 pair per 22 acres (8.9 ha) in suitable habitat (Odum 1941). Winter—1 bird per 2.66 acres (1.1 ha) in bottomland woods in New York (Butts 1931). Maximum 27 pairs per 40 ha (100 acres) (Hardin and Evans 1977).

FORAGING: Major foods: Insects, seeds, fruits. Substrates: Bark crevices; leaf, branch, and twig surfaces. Techniques: Gleaning, probing of tree trunk, branches, leaves. Preferred feeding habitat: Chickadees feed where food is most abundant. Kluyver (1961) found that birds fed more often in pine groves with abundant caterpillars than in adjacent oak woods.

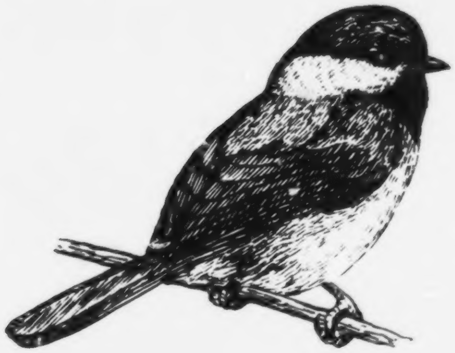
COMMENTS: A study by Odum (1941) revealed that nests were often located in open woods or forest edges and feeding was heaviest in deep woods.

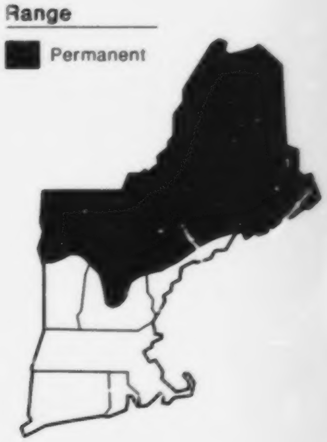
KEY REFERENCES: Brewer 1961; Kluyver 1961; Odum 1941, 1942.

Boreal Chickadee

(Parus hudsonicus)

A.O.U. No. 740.0





RANGE: Breeding: Labrador, w. to nw. Alaska, s. to Maine, n. New York and s. British Columbia. Winter: Same as breeding range. Wanders to se. New York and s. New Jersey.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) and rare (Massachusetts).

HABITAT: Breeding: Northern coniferous woods, wooded swamps, bogs. Wintering: Same as breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Decaying trees for excavating cavities. McLaren (1975) found that Chickadees preferred to nest in trees with soft wood and hard exterior layers and bark.

NESTING: Egg dates: June 11 to July 17 (late), New York (Bull 1974:402). Clutch size: 4 to 9, typically 6 or 7. Incubation period: 12 to 13 days (Harrison 1975). Nestling period: About 18 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 1 to 10 feet (0.3 to 3.0 m). Nest site: Decaying stub or tree, preferably with firm exterior and soft interior. Bird may excavate several holes before choosing one for nest. Sometimes uses natural cavities or old woodpecker holes.

TERRITORY SIZE: Larger than 5 ha (12.4 acres) in spruce-fir forest (McLaren 1975).

FORAGING: Major foods: Insects, seeds, fruits. Substrates: Bark crevices, leaves, twigs, branches. Techniques: Gleaning, probing of tree trunk, branches, needles, cover.

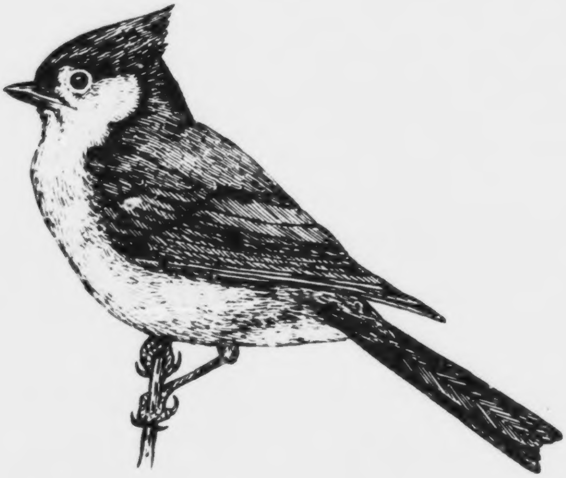
COMMENTS: Nest site selection seems to be influenced more by the softness of the wood than by species of tree (McLaren 1975).

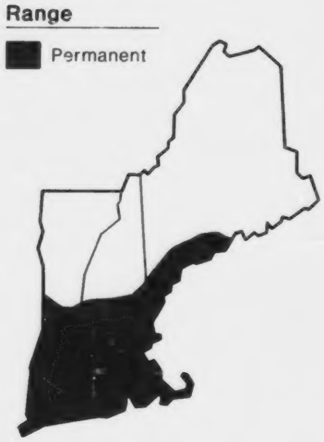
KEY REFERENCES: Bent 1946, Forbush 1929, McLaren 1975.

Tufted Titmouse

(Parus bicolor)

A.O.U. No. 731.0





RANGE: Breeding: Central New England, w. to Illinois and n. Nebraska, s. to Florida, the Gulf Coast and Texas. Increasing and spreading n. in the Northeast. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common except at limits of range.

HABITAT: Breeding: Low rich woodlands, moist bottomlands and swamps, residential areas in shade trees. Wintering: Same but with preference for feeding stations.

SPECIAL HABITAT REQUIREMENTS: Nesting cavities, commonly in mixed woods.

NESTING: Egg dates: April 29 to May 27, New York (Bull 1974:404). Clutch size: 4 to 8, typically 5 or 6. Incubation period: 12 days. Nestling period: 15 to 18 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 3 to 90 feet (0.9 to 27.4 m). Nest site: A natural tree cavity or old woodpecker hole. It is generally believed that Tufted Titmice do not excavate their own nest sites. Accept nest boxes.

TERRITORY SIZE: 2.9 acres (1.2 ha) in oak-hickory-elm habitat in Kansas (Fitch 1958).

HOME RANGE: 5 birds were repeatedly recorded year-round within a 0.6 mile (0.9 km) radius from a banding station in Michigan (Van Tyne 1948). Average sizes of minimum home ranges in winter ranged from 10.4 to 19.7 acres (4.2 to 8.0 ha) in Kansas (Fitch 1958).

SAMPLE DENSITIES: Maryland—13 pairs per 100 acres (40 ha) in well-drained floodplain forest. 13 pairs per 100 per 100 acres (40 ha) in upland oak forest. 11 pairs per 100 acres (40 ha) in second-growth river swamp. 6 pairs per 100 acres (40 ha) in pine-oak forest (Stewart and Robbins 1958:226).

FORAGING: Major foods: Insects, seeds, and fruits, especially mast. Substrates: Branch and leaf surfaces (spring and summer), branch surfaces (winter); ground, especially exposed soil (Fitch 1958). Techniques: Gleaning, probing. Preferred feeding habitat: Often in canopy, but very frequently near the ground when not disturbed by observers.

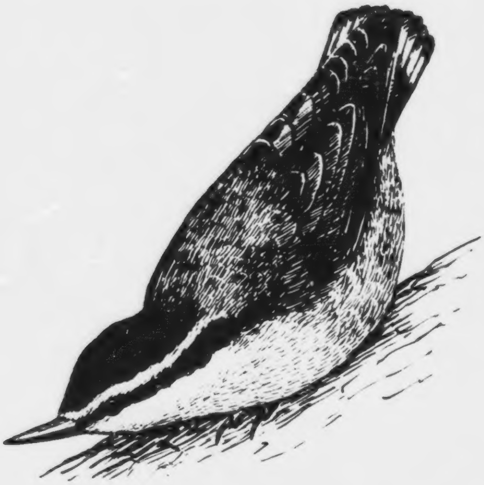
COMMENTS: Pairs may mate for life (Gillespie 1930). Beal (1916 in Bent 1946:399) found the food of 186 birds consisted of 67 percent animal and 33 percent vegetable matter. May have extended its range in the Northeast via reduced winter mortality due to suburban feeding stations.

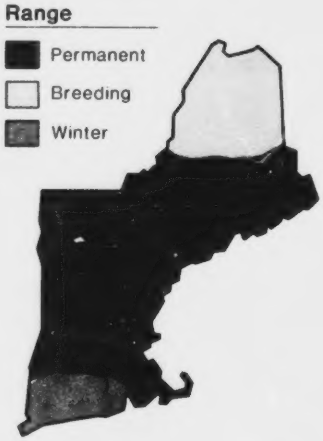
KEY REFERENCES: Bent 1946, Boyd 1962, Forbush 1929, Gillespie 1930, Laskey 1957.

Red-breasted Nuthatch

(Sitta canadensis)

A.O.U. No. 728.0





RANGE: Breeding: Newfoundland, w. to Alaska, s. to New Jersey, North Carolina (mountains) and s. California. Winter: Northern United States, irregularly s. to Florida, the Gulf Coast and n. Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine).

HABITAT: Breeding: Coniferous forests, sometimes in mixed woodlands. Wintering: Mainly coniferous forests but also frequents mixed woodlands with cone-bearing trees. Less often in deciduous woods (winter only).

SPECIAL HABITAT REQUIREMENTS: Coniferous woods, cavity for nesting in tree with minimum d.b.h. of 12 inches (30.5 cm) (Thomas et al. 1979).

NESTING: Egg dates: April 13 to June 17, New York (Bull 1974:409). Clutch size: 4 to 7, typically 5 or 6. Incubation period: 12 days. Nestling period: 21 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 5 to 40 feet (1.5 to 12.2 m), typically 15 feet (4.6 m). Nest site: A cavity in a rotted stub or dead branch, usually excavated but occasionally uses an old woodpecker hole.

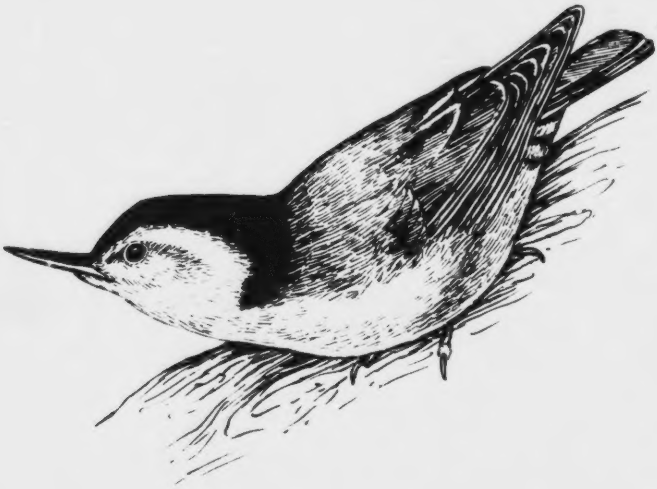
FORAGING: Major foods: Small insects, seeds—especially of pine, spruce and fir. Substrates: Mainly along twigs and small branches (Bull 1974:409). Techniques: Gleaning, probing.

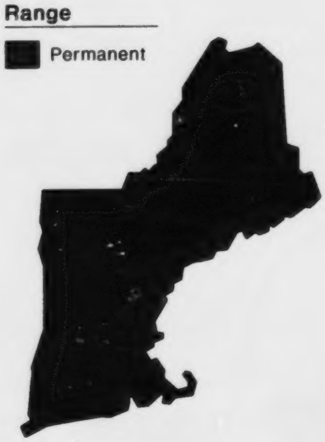
KEY REFERENCES: Bent 1948, Lawrence 1952.

White-breasted Nuthatch

(Sitta carolinensis)

A.O.U. No. 727.0





RANGE: Breeding: Southern Quebec, w. to s. British Columbia, s. to Florida and Mexico. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Mixed or deciduous woodlands with large trees, orchards, villages. Wintering: Birds tend to remain in breeding areas.

SPECIAL HABITAT REQUIREMENTS: Natural cavities for nesting. Trees with minimum d.b.h. of 12 inches (30.5 cm) (Thomas et al. 1979) are most suitable.

NESTING: Egg dates: April 3 to June 6, New York (Bull 1974:407). Clutch size: 5 to 9, typically 8. Incubation period: 12 days. Nestling period: About 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 15 to 50 feet (4.6 to 15.2 m). Nest site: Cavity in a live, dead, or dying tree at almost any height above ground. Seems to prefer rotted out knot holes or similar natural openings to old woodpecker holes (Pough 1949:95). Rarely, if ever, excavates own cavity. Much competition for natural cavities occurs between White-breasted Nuthatches and gray and red squirrels (Kilham 1968b).

TERRITORY SIZE: Winter feeding territories ranged from 25 to 30 acres (10.1 to 12.1 ha) per pair in woodlands and about 50 acres (20.2 ha) per pair in semiwooded country (Butts 1931).

SAMPLE DENSITIES: 1 pair per 24 acres (9.6 ha) in New York (Butts 1931). 6 pairs per 100 acres (40 ha) in oak, tulip-poplar forest in Maryland. 5 pairs per 100 acres (40 ha) in semi-open floodplain forest (sycamore, ash, elm) in Maryland (Stewart and Robbins 1958:228).

FORAGING: Major foods: Insects, seeds, fruits, mast. The main summer diet consists of gypsy moth larvae and tent caterpillars, beetles, spiders, and ants (Hardin and Evans 1977). Substrates: Trunks and larger branches of trees, bark crevices. Techniques: Gleaning, probing. Preferred feeding habitat: Often uses feeding stations, especially in winter.

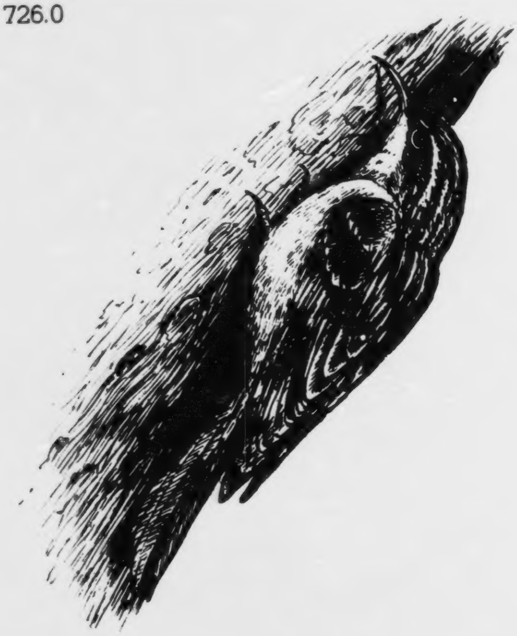
COMMENTS: The spring diet consists of more than 79 percent insects. The winter diet contained 26 percent animal and 67 percent vegetable (Forbush 1929). Birds commonly store food in crevices of bark (Kilham 1974).

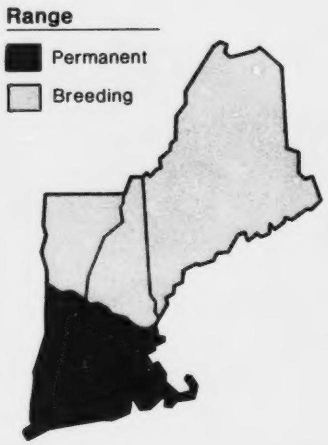
KEY REFERENCES: Bent 1948, Butts 1931, Forbush 1929, Kilham 1968b.

Brown Creeper

(Certhia americana)

A.O.U. No. 726.0





RANGE: Breeding: Nova Scotia, w. through the s. Canadian provinces to Alaska, s. to Maryland (locally), the mountains of North Carolina and the Rockies. Winter: Northern United States, s. to Florida, the Gulf Coast, and c. Texas.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Dense coniferous, deciduous, or mixed woodlands, wooded swamps. Wintering: Same but birds retreat to lower altitudes.

SPECIAL HABITAT REQUIREMENTS: Standing dead trees with loose bark. The minimum d.b.h. of suitable nest trees is 10 inches (25.4 cm) (Thomas et al. 1979).

NESTING: Egg dates: April 24 to June 30, New York (Bull 1974:412). Clutch size: 5 to 9, typically 5 or 6. Incubation period: 14 to 15 days. Nestling period: 13 to 15 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 5 to 15 feet (1.5 to 4.6 m). Nest site: Low on trunk of coniferous or deciduous tree under a strip of loose bark, less often in a rotted knothole or old woodpecker cavity (probably only when loose bark is unavailable).

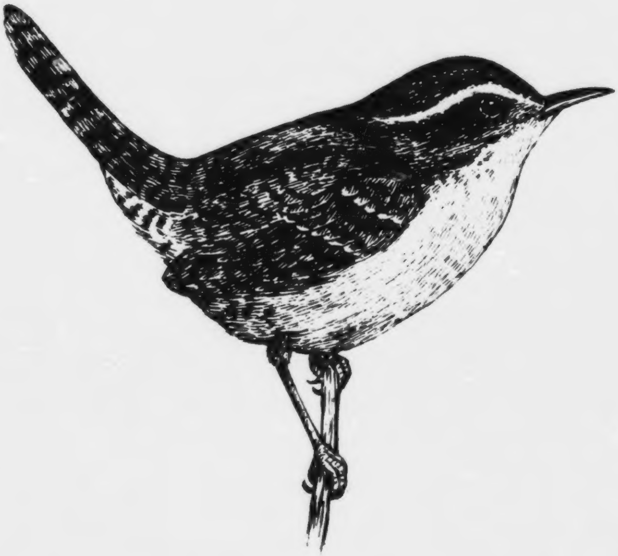
FORAGING: Major foods: Insects; a small amount of vegetable material, mainly mast. Substrates: Bark crevices, trunk, sides and undersides of limbs. Techniques: Gleaning, probing, scaling. Preferred feeding habitat: Sometimes attracted to suet at feeding stations in winter.

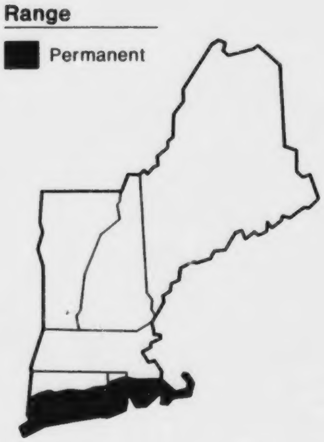
KEY REFERENCES: Bent 1948, Forbush 1929.

Carolina Wren

(Thryothorus ludovicianus)

A.O.U. No. 718.0





RANGE: Breeding: Southern New England, c. New York (except mountains), w. to se. Wisconsin and Iowa, s. to the Gulf Coast and Mexico. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare (Massachusetts).

HABITAT: Breeding: A variety of places from lowland stream bank tangles to upland brushy slopes, woodland edges, slash piles, vicinity of buildings. Prefers moist areas. Wintering: Low, flat ground near tidewater creeks (New Jersey—Bent 1948). Narrow Valleys and deep ravines in parts of winter range. Trautman (1940) observed wrens in Ohio that moved from partly exposed areas to sheltering woodlands in extremely cold weather.

SPECIAL HABITAT REQUIREMENTS: Low brushy vegetation.

NESTING: Egg dates: April 15 to August 15, birds in s. New York have at least 2 broods (Bull 1974:417). Clutch size: 4 to 8, typically 5 or 6. Incubation period: 14 days. Nestling period: 13 to 14 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: To 10 feet (0.3 m), typically less than 10 feet (3 m). Nest site: Commonly nests in a cavity in a variety of places both natural and man-made. Less often builds a matted ball of sticks in a low shrub or in grasses that has a side entrance and central cavity.

TERRITORY SIZE: Wrens occupied a wooded ravine-pond habitat in Kansas for 4 years and defended the following areas: 5.8, 9.2, 3.9, and 7.6 acres (2.3, 3.7, 1.6, and 3.1 ha) (Fitch 1958). Average 0.3 acre (0.1 ha) in a swamp-thicket in Illinois (Brewer 1955).

SAMPLE DENSITIES: Maryland: 11 territorial males per 100 acres (40 ha) in hardwood forest (oaks, tulip-poplar) with scattered pine. 6 territorial males per 100 acres (40 ha) in well-drained flood-plain forest (Stewart and Robbins 1958:235).

FORAGING: Major foods: Insects, occassionally takes wild fruits. Substrates: Trunks of trees, branches of shrubs, leaf surfaces, ground litter. Techniques: Tree, shrub, leaf gleaning, creeping.

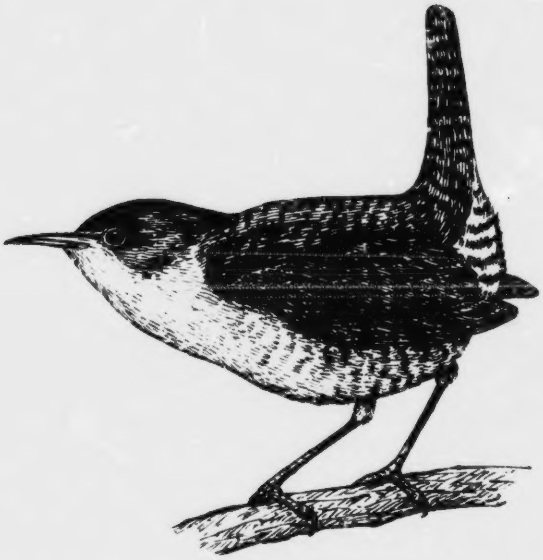
COMMENTS: Northern limit of this species varies with the degree of winter severity (expands in mild winters and recedes with harsh weather). The contents of 291 stomachs collected throughout the year held 94 percent animal and 6 percent vegetable matter (Beal et al. 1916 in Bent 1948:209).

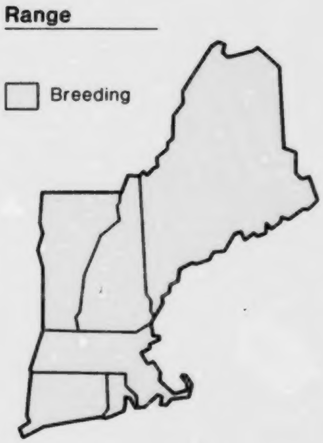
KEY REFERENCES: Bent 1948, Nice and Thomas 1948.

House Wren

(Troglodytes aedon)

A.O.U. No. 721.0





RANGE: Breeding: New Brunswick w. to British Columbia, s. to South Carolina, Missouri, and Texas. Winter: Southern Maryland w. to California, s. to s. Mexico. Rarely farther n.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (s. New England) to uncommon (Maine).

HABITAT: Breeding: Near human dwellings with sufficient woody vegetation and cavities for nesting, edges of woodlands, farmland, open forests and clearings, suburban gardens, orchards, swampy woodlands. Very adaptable in nesting habits. Avoids deep forest interiors and high elevations. Wintering: Thickets, brushpiles.

SPECIAL HABITAT REQUIREMENTS: Cavity for nesting in tree with minimum d.b.h. of 10 inches (25.4 cm) (Thomas et al. 1979).

NESTING: Egg dates: May 15 to July 31 (second brood), New York (Bull 1974:413). Clutch size: 5 to 8, typically 6 to 8. Incubation period: About 15 days. Nestling period: 12 to 18 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: To 10 feet (0.3 m), typically less than 10 feet (0.3 m). Nest site: nests in cavity in a variety of sites such as trees, fence posts, tin cans, eaves of buildings, nest boxes. Cavity may be natural, excavated by a woodpecker, or man-made.

TERRITORY SIZE: 178 territories ranged from 0.25 to 2.75 acres (0.1 to 1.1 ha) in forest edge and shrubby pasture habitat in Ohio (Kendeigh 1941b).

SAMPLE DENSITIES: 40 pairs per square mile (15 pairs/km^2) (maximum density) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 100 territorial males per 100 acres (40 ha) in farmyard and orchard in Maryland. 50 territorial males per 100 acres (40 ha) in damp deciduous scrub with standing snags in Maryland. 14 territorial males per 100 acres (40 ha) in unsprayed orchard in Maryland (Stewart and Robbins 1958:232).

FORAGING: Major foods: Small insects, beetles, caterpillars, and bugs. Substrates: Low woody vegetation. Techniques: Ground and shrub stem gleaning, hawking.

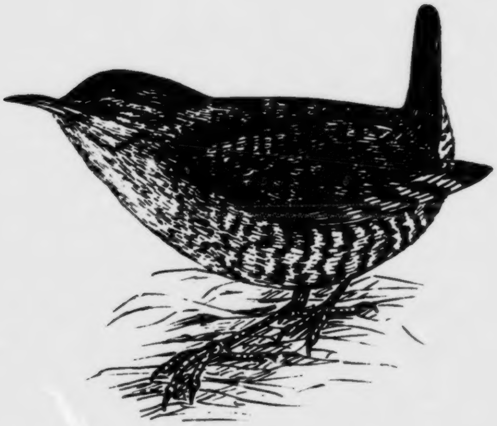
COMMENTS: Males are polygynous.

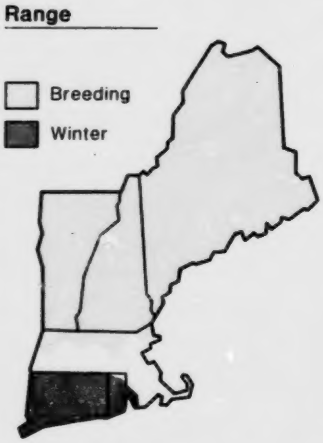
KEY REFERENCES: Bent 1948, Forbush 1929, Kendeigh 1941b, Odum and Johnston 1951.

Winter Wren

(Troglodytes troglodytes)

A.O.U. No. 722.0





RANGE: Breeding: Newfoundland w. to s. Alaska, s. in the mountains to n. Georgia and n. Colorado. Winter: Southern New England w. to Colorado, s. to the Gulf States.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon (Massachusetts).

HABITAT: Breeding: Usually in or near dense undergrowth of damp coniferous forests, in thickets near woodland streams, banks of marshy ditches, piles of slash, boreal bogs, usually with a dead log from which to sing. Wintering: Dense undergrowth, especially in moist areas.

SPECIAL HABITAT REQUIREMENTS: Moist coniferous woodlands with low woody vegetation or low-lying cold bogs or swamps. Stevens (1976), however, noted birds in mixed and hardwood forests on north-facing slopes in the mountains of Virginia.

NESTING: Egg dates: May 22 to July 7, New York (Bull 1974:415). Clutch size: 4 to 7, typically 5 or 6. Incubation period: 14 to 16 days. Nestling period: Probably about 2 weeks (Harrison 1975). Broods per year: 2. Age at sexual maturity: 1 year. Nest site: In hollow at base of stump or tree, tangled roots of fallen trees, in cavities in man-made structures, old woodpecker holes.

TERRITORY SIZE: Approximately 1 to 7 acres (0.4 to 2.8 ha) (average 2 to 3 acres (0.8 to 1.2 ha)) in garden-woodland areas (Armstrong 1956:430).

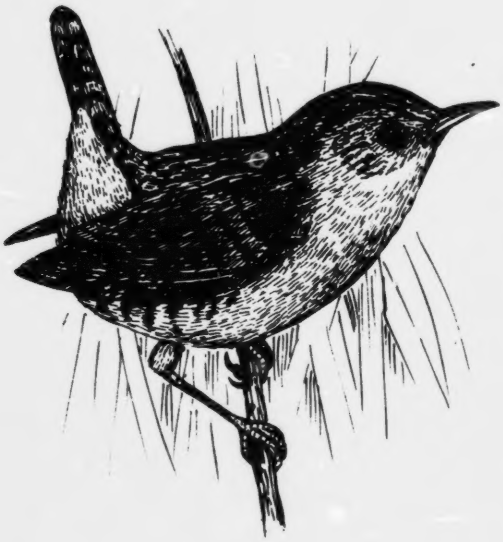
FORAGING: Major food: Insects. Substrate: Ground. Technique: Gleaning.

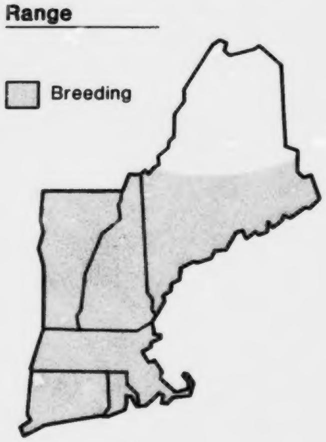
KEY REFERENCES: Armstrong 1956, Bent 1948.

Sedge Wren

(Cistothorus platensis)

A.O.U. No. 724.0





RANGE: Breeding: Maine s. to Maryland, w. to Indiana and Kansas. Winter: Coastal areas—s. Maryland, s. to Florida and along the Gulf of Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare. Very local throughout e. parts of range during breeding season. Isolated individuals usually found.

HABITAT: Breeding: Sedge meadows, shallow sedge marshes with scattered shrubs and little or no standing water, coastal brackish marshes of *Spartina patens* with scattered low shrubs and herbs. Wintering: Tidal sedge meadows and marshes.

SPECIAL HABITAT REQUIREMENTS: Sedge meadows.

NESTING:Egg dates: May 28 to July 30, New York (Bull 1974:419). Clutch size: 4 to 8 typically 7. Incubation period: 12 to 14 days. Nestling period: 12 to 14 days. Broods per year: 1 to 3. Age at sexual maturity: 1 year. Nest height: 1 to 3 feet (0.3 to 0.9 m), typically 2 to 3 feet (0.6 to 0.9 m). Nest site: Usually close to the ground and well hidden in meadow grasses. Nests singly or in loose colonies in good habitat. Male builds many unlined dummy nests in territory.

SAMPLE DENSITIES: 35 to 40 singing males were counted in a 10-acre (4-ha) marsh (Harrison 1975:152). 10 territorial males per 100 acres (40 ha) in switchgrass marsh-meadow in Maryland (Stewart and Robbins 1958:238).

FORAGING: Major foods: Insects, spiders. Substrates: Ground, marsh vegetation. Technique: Gleaning.

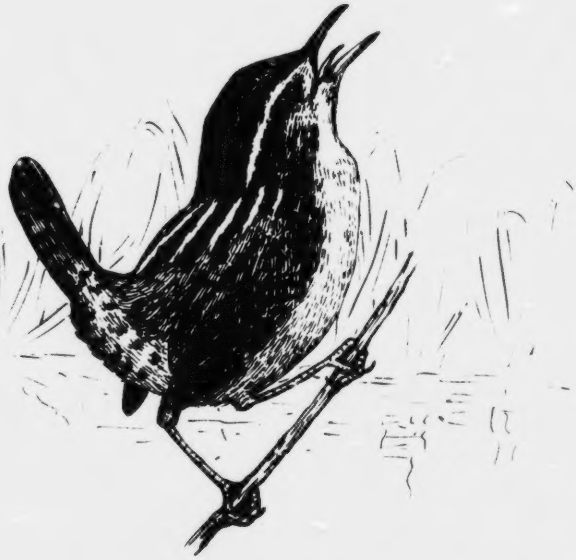
COMMENTS: The secretive habits of this species have made it difficult to study. Seldom found in same area 2 years in succession in New Hampshire (C. Anderson, personal communication).

KEY REFERENCES: Bent 1948, Walkinshaw 1935.

Marsh Wren

(Cistothorus palustris)

A.O.U. No. 725.0



Range
☐ Breeding

RANGE: Breeding: Southern New Brunswick w. to British Columbia s. to Florida and s. California. Winter: Mid-Atlantic States, w. to Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon (Massachusetts).

HABITAT: Breeding: Large fresh or brackish marshes with abundant tall herbaceous vegetation such as cattails, purple loosestrife, sedges or rushes, shores of sluggish rivers, inland ponds. Wintering: Tidal marshes with tall herbaceous vegetation.

SPECIAL HABITAT REQUIREMENTS: Marshes.

NESTING: Egg dates: May 22 to August 7 (second brood), New York (Bull 1974:419). Clutch size: 3 to 8, typically 5. Incubation period: 12 to 16 days. Nestling period: 14 to 16 days. Independence when about 23 days old (Verner 1965). Broods per year: 2. Age at sexual maturity: 1 year. Nest height: 1 to 3 feet (0.3 to 0.9 m). Nest site: Usually in tall marsh plants growing in shallow water, less often in small bushes or trees. Constructs many dummy nests that may be used for roosting (Bull 1974:419).

TERRITORY SIZE: 11 territories averaged 60 m^2 (71.8 square yards) in tall marsh grasses interspersed with shorter grasses along a river in Georgia. 22 territiories averaged 85.3 m^2(102 square yards) in *Spartina* spp. along a creek in Georgia (Kale 1965). Territories ranged from 2,600 square feet (241.5 m^2) to 38,700 square feet (3,595 m^2) (average 15,000 square feet (1,393.3 m^2)) in cattails with scattered stands of bulrush. Territories ranged from 1,800 to 9,600 square feet (167.2 to 891.7 m^2) (average 5,000 square feet (464.4 m^2)) in narrow-strips and patches of bulrush in Washington (Verner 1965). The territories of monogamous males ranged from 13,000 to 15,000 square feet (1,207.6 to 1,393.3 m^2) in cattail-sedge association and 30,000 square feet (2,786.7 m^2) in grasses in New York (Welter 1935).

SAMPLE DENSITIES: Maryland—104 territorial males per 100 acres (40 ha) in uniform needlerush marsh. 36 territorial males per 100 acres (40 ha) in cattail marsh (Stewart and Robbins 1958:236).

FORAGING: Major foods: Insects, spiders. Substrates: Stems and leaves of marsh vegetation, water. Techniques: Gleaning, hawking.

KEY RFFERENCES: Kale 1965, Verner 1965, Welter 1935.

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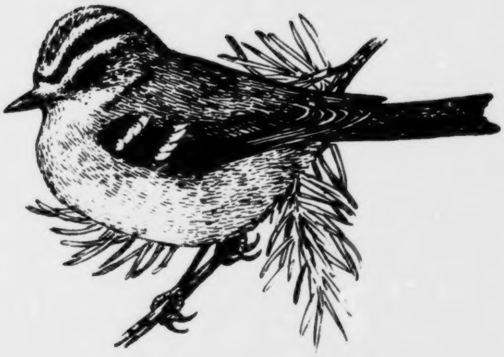
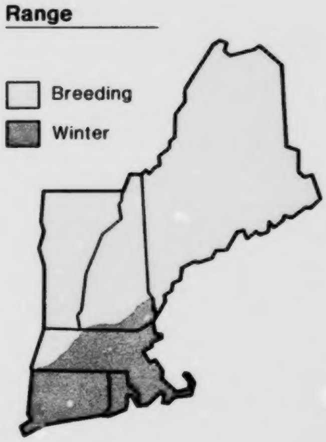
Golden-crowned Kinglet

(Regulus satrapa)

A.O.U. No. 748.0





RANGE: Breeding: Nova Scotia w. to se. Alaska, s. to Massachusetts, the mountains of North Carolina, New Mexico, and s. California. Winter: Southern New England w. to Ohio and British Columbia, s. to n. Florida and s. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Breeding: Mainly in dense, northern coniferous forests of spruce but nests in pine, fir, hemlock, and tamarack woods and cedar bogs. Evergreen plantations in central and western New York provide suitable habitat (Bull 1974:443). See comments. Wintering: Moist coniferous, mixed, or deciduous forests (Lepthien and Bock 1976), thickets and low tangles of weedy growth (Pough 1949:126).

NESTING: Egg dates: May 28 to June 26, New York (Bull 1974:444). Clutch size: 5 to 10, typically 8 or 9. Incubation period: Unknown. Probably 14 to 15 days. Broods per year: 2. Nest height: 6 to 60 feet (1.8 to 18.2 m), typically 30 to 60 feet (9.1 to 18.2 m). Nest site: Usually woven into twigs of a horizontal limb of a conifer.

SAMPLE DENSITIES: 1 pair per 2 acres (0.8 ha) in Adirondack coniferous forest (Andrle 1971). 32 pairs per 100 acres in virgin spruce-hemlock bog forest in Maryland (Stewart and Robbins 1958:255).

FORAGING: Major food: Insects. Substrates: Leaves, branches and twigs, trunks (bark crevices). Techniques: Gleaning, hawking, hover-gleaning.

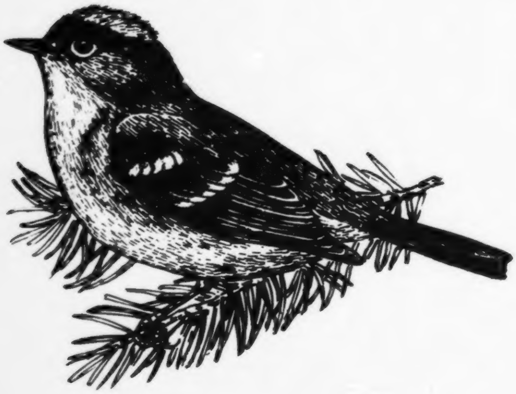
COMMENTS: Golden-crowned Kinglets have been extending their breeding range in New York by nesting in plantations of spruce with a minimum d.b.h. of 6 inches (15 cm) and dense, closed canopies (Andrle 1971). In New Hampshire this species is limited to boreal habitats (C. Anderson, personal communication).

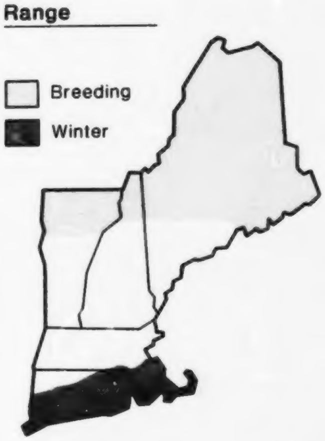
KEY REFERENCES: Andrle 1971, Bent 1949, Lepthien and Bock 1976.

Ruby-crowned Kinglet

(Regulus calendula)

A.O.U. No. 749.0





RANGE: Breeding: Quebec w. to Alaska, s. to n. Maine, Adirondacks of New York, Ontario, New Mexico and s. California. Winter: Southern New England w. to British Columbia, s. to s. Florida and Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Breeding: Northern coniferous forests in pure or mixed stands of spruce, fir, tamarack or pine, forest edges, open stands, bogs. Wintering: Coniferous or deciduous forest understory, open or edge situations, especially in dry oak woodland (Lepthien and Bock 1976).

NESTING: Clutch size: 5 to 11, typically 7 to 9. Incubation period: Believed to be about 12 days. Nestling period: Possibly 12 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 2 to 100 feet (0.6 to 30.5 m), typically 15 to 60 feet (4.6 to 18.2 m). Nest site: Nest is usually well concealed in coniferous shrub or tree at tip of horizontal branch, typically in spruce.

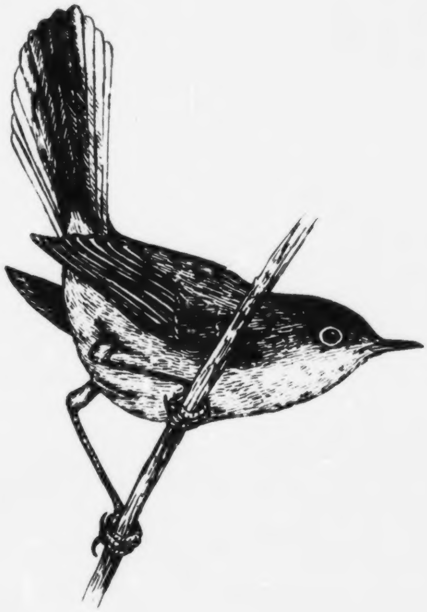
FORAGING: Major foods: Insects (summer), insects supplemented with seeds and fruits (winter). Substrates: Leaf litter; leaves and stalks of herbaceous plants; bark of twigs, branches, and trees; clusters of needles. Techniques: Hawking, gleaning, hover-gleaning. Preferred feeding habitat. In winter, birds forage close to the ground—frequenting thickets and saplings in deciduous as well as coniferous woodlands.

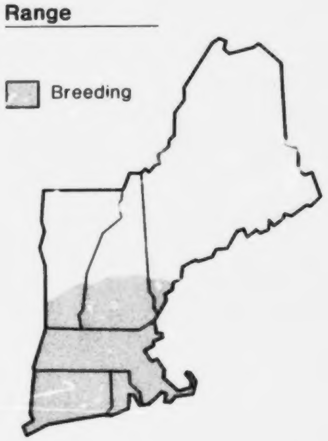
KEY REFERENCES: Bent 1949, Forbush 1929, Lepthien and Bock 1976.

Blue-gray Gnatcatcher

(Polioptila caerulea)

A.O.U. No. 751.0





RANGE: Breeding: Southern New England, w. Pennsylvania, w. to ne. California, s. to s. Mexico. Winter: South Carolina s. through the coastal states to s. California, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare (Maine).

HABITAT: Breeding: Open, moist woodlands interspersed with brushy clearings, often oak, pine, or mixed woods, bottomland forests with closed canopies, wooded swamps, stream-side thickets. Favors tall trees.

SPECIAL HABITAT REQUIREMENTS: An abundant supply of arthropods (Root 1967).

NESTING: Egg dates: May 14 to June 17, New York (Bull 1974:441). Clutch size: 3 to 5, typically 4 or 5. Incubation period: 13 to 15 days. Nestling period: 10 to 13 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 4 to 70 feet (1.2 to 21.3 m), typically less than 25 feet (7.6 m). Nest site: Usually high in a deciduous or coniferous tree saddled on a horizontal limb or in a fork. Nests in a variety of trees—limb size and shape seem to be more important than tree species (Bent 1949).

TERRITORY SIZE: 9 territories ranged from 2.2 to 7.4 acres (0.9 to 3.0 ha) average 4.6 acres (1.8 ha)) in oak woodland and chaparral in California (Root 1970). 1 territory covered 2.2 acres (0.9 ha) along a wooded ravine and grove of trees in Kansas (Fitch 1958).

SAMPLE DENSITIES: Maryland—7 pairs per 100 acres (40 ha) in semi-open floodplain forest. 6 pairs per 100 acres (40 ha) in unsprayed orchard (Stewart and Robbins 1958:254).

FORAGING: Major foods: Apparently feeds exclusively on arthoropods, primarily insects. Substrates: Tips of branches, leaf surfaces, bark. Techniques: Hawking, hover-gleaning, twig and leaf gleaning. Preferred feeding habitat: High canopy of forest trees.

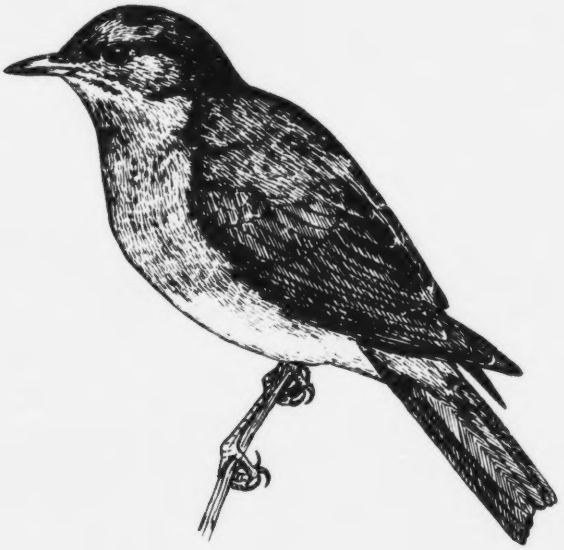
COMMENTS: Most breeding birds in New York were seen near lakes or rivers (Bull 1974:441).

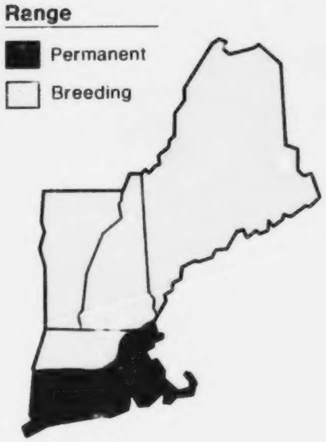
KEY REFERENCES: Forbush 1929; Nice 1932, Root 1967, 1970.

Eastern Bluebird

(Sialia sialis)

A.O.U. No. 766.0





RANGE: Breeding: Newfoundland w. to s. Manitoba, s. to Florida, the Gulf Coast and Central America. Winter: Southern New England w. to s. Michigan, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Open country with scattered trees (savannas), farmlands, open woods, swamps, sparsely inhabited residential areas, roadside fencelines, woodland edges beside fields and meadows, orchards, clearings created by fire, flood, or logging. Wintering: Graber and Graber (1963) found that bluebirds in Illinois favored grasslands, shrub areas, and forest edges in winter.

SPECIAL HABITAT REQUIREMENTS: Low cavities for nesting. Abundant perches for foraging (Pinkowski 1977).

NESTING: Egg dates: April 1 to August 18, New York (Bull 1974:438). Clutch size: 3 to 7, typically 4 or 5. Incubation period: 13 to 15 days. Nestling period: 15 to 18 days. Broods per year: 2 or 3. Age at sexual maturity: 1 year. Nest height: 5 to 20 feet (1.5 to 6.1 m), typically 5 to 12 feet (1.5 to 3.7 m). Nest site: Natural cavities, old woodpecker holes, or nest boxes.

TERRITORY SIZE: 5.4, 8.6, and 7.0 acres (2.2, 3.5, and 2.8 ha) for 3 territories in Kansas (Fitch 1958). 2.5 acres (1.0 ha) (Thomas 1946).

HOME RANGE: Pinkowski (1977) found bluebirds foraging on areas ranging in size from 4.5 to 38.9 ha (11.1 to 96.1 acres during nestling periods.

SAMPLE DENSITIES: 30 birds per 100 acres (40 ha) in orchard in Illinois. 34 birds per 100 acres (40 ha) in edge shrubbery in Illinois. 25 birds per 100 acres (40 ha) in residential habitat in Illinois. 13 birds per 100 acres (40 ha) in second-growth or cutover woods in Illinois (Graber et al. 1971).

FORAGING: Major foods: Insects, especially grasshoppers, crickets, beetles, and caterpillars, make up about 68 percent of diet; fruit represents about 32 percent of diet (Bent 1949:247). Substrates: Leaf and branch surfaces, leaf litter on ground, air. Techniques: Gleaning, flight-gleaning, dropping to ground from perch, hawking. Preferred feeding habitat: Areas with poor soil and sparse ground cover (Pinkowski 1977).

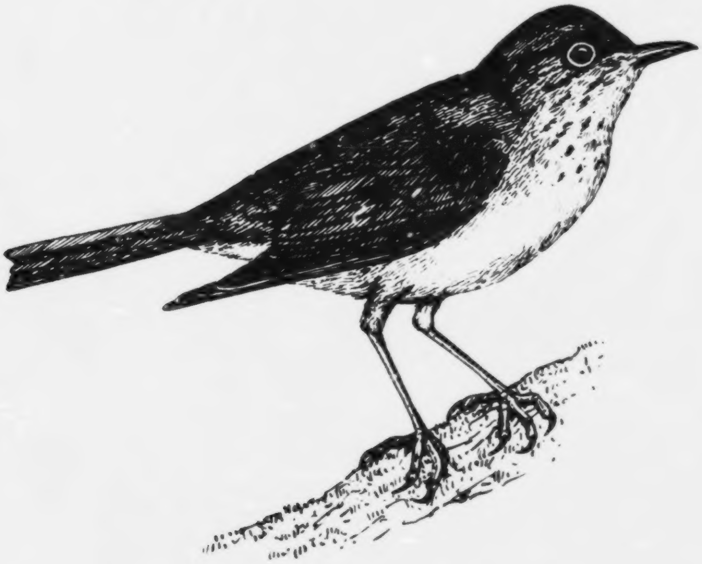
COMMENTS: Suitable nest sites are scarce since many snags have been removed. Starlings, House Sparrows, Tree Swallows, and Wrens compound the problem by competing successfully for cavities. Conner and Adkisson (1974) found that clearcuts with standing, cavity-bearing snags provided bluebird nesting habitat for at least 12 years following cutting.

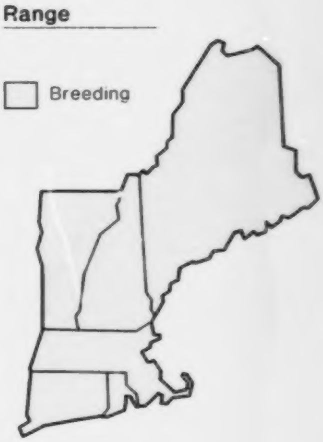
KEY REFERENCES: Bent 1949, Graber et al. 1971, Hartshorne 1962, Lasky 1940, Peakall 1970, Thomas 1946.

Veery

(Catharus fuscescens)

A.O.U. No. 756.0





RANGE: Breeding: Newfoundland w. to British Columbia, s. to Long Island and c. New Jersey, and the mountains of Georgia, and New Mexico. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Low, moist deciduous woods, bottomland forests, wooded swamps, damp ravines. Prefers thickets of early deciduous second-growth and open woods with fairly dense high undergrowth of ferns, shrubs, and trees. Avoids mountains.

SPECIAL HABITAT REQUIREMENTS: Moist woodlands with understory of low trees and shrubs.

NESTING: Egg dates: May 16 to June 25, New York (Bull 1974:436). Clutch size: 3 to 5, typically 4. Incubation period: 10 to 12 days. Nestling period: 16 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: To 3 feet (0.9 m), typically on ground. Nest site: On ground or low in a shrub, tree, or brush pile, often well hidden on a tussock of ferns or other groundcover.

SAMPLE DENSITIES: 12 pairs on a 3-acre (1.2 ha) plot of lake-side forest with laurel understory in New Hampshire (Harding 1925). 8 territorial males per 100 acres (40 ha) in virgin hemlock stand (Stewart and Robbins 1958:251).

FORAGING: Major foods: Mainly insects (about 60 percent) and wild fruits and seeds (40 percent). Substrates: Forest floor (leaf litter), leaf and branch surfaces in lower canopy. Techniques: Ground gleaning, turning leaves with bill.

COMMENTS: Bertin (1977) found Veeries in cool wet areas of both early successional and mature woodlands. In mature woodlands, Veeries used areas with cool microclimates.

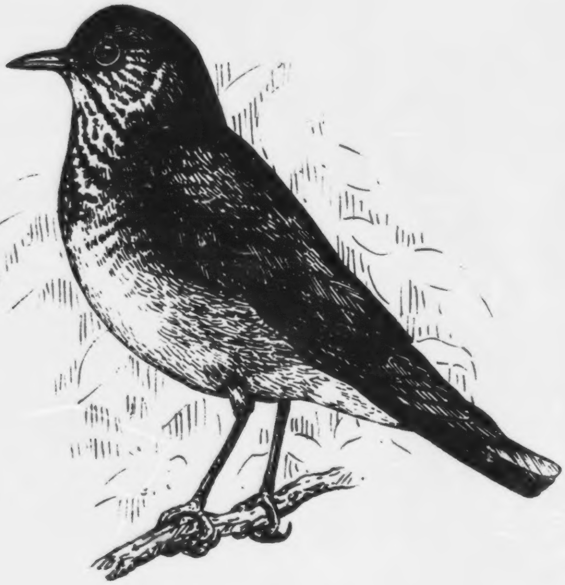
KEY REFERENCES: Bent 1949, Bertin 1977, Dilger 1956, Forbush 1929.

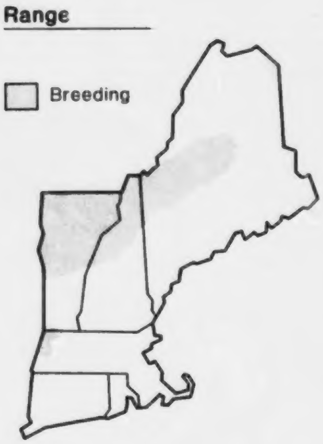
BEST COPY AVAILABLE

Gray-cheeked Thrush

(Catharus minimus)

A.O.U. No. 757.0





RANGE: Breeding: Northern Newfoundland w. to Alaska s. to the mountains of n. New England and se. New York, and the s. Canadian provinces. Locally in Berkshires and Catskills in highest mountains. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (Maine).

HABITAT: Breeding: Moist northern coniferous forests, especially in stunted spruce-fir tangles of mountain tops.

SPECIAL HABITAT REQUIREMENTS: Coniferous forests.

NESTING: Egg dates: June 12 to June 27, New York (Bull 1974:435). Clutch size: 3 to 5, typically 4. Incubation period: 13 to 14 days. Nestling period: About 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: To 20 feet (6.1 m), typically about 6 feet (1.8m). Nest site: Usually in bush or the fork of a low conifer limb, occasionally in a birch, sometimes builds on ground under low-hanging limb.

FORAGING: Major foods: Insects, wild fruits. Substrates: Forest floor which is usually carpeted with sphagnum and other mosses. Techniques: Ground gleaning. Preferred feeding habitat: On ground in forest interior.

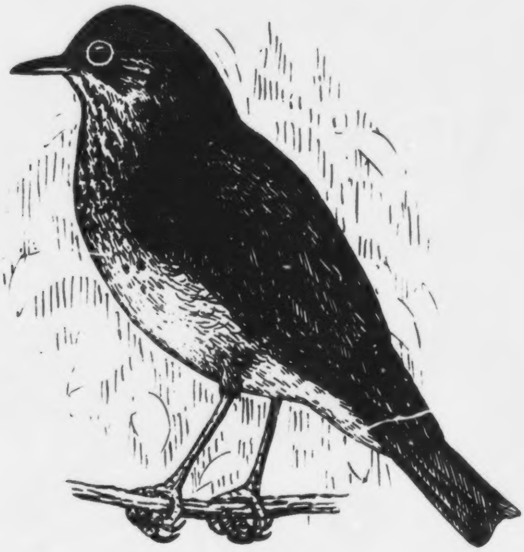
COMMENTS: About 75 percent of the diet is animal matter and 25 percent vegetable matter (Beal 1915 in Bent 1949:192).

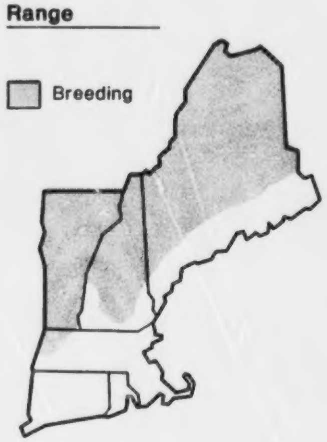
KEY REFERENCES: Bent 1949, Dilger 1956, Forbush 1929, Wallace 1939.

Swainson's Thrush

(Catharus ustulatus)

A.O.U. No. 758.0





RANGE: Breeding: Newfoundland w. to Alaska, s. to n. New England, Pennsylvania, Colorado, and s. California. Rarely in mountains of West Virginia and Maryland. Winter: Central and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine).

HABITAT: Breeding: Spruce-fir forests especially in low damp areas near water. Occurs in both young stands and mature forest. Prefers forest interiors to edges. Occasionally breeds in mixed woodlands.

SPECIAL HABITAT REQUIREMENTS: Coniferous or mixed forests.

NESTING: Egg dates: June 10 to July 11, New York (Bull 1974:433). Clutch size: 3 to 5, typically 4. Incubation period: 10 to 13 days. Nestling period: 10 to 12 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 2 to 20 feet (0.6 to 6.1 m), typically 4 to 8 feet (1.2 to 2.4 m). Nest site: Usually in a crotch close to trunk or on a horizontal limb of a spruce or fir tree.

FORAGING: Major foods: Insects, wild fruits. Substrates: Forest floor, foliage and branch surfaces, often high in trees. Techniques: Ground gleaning, hawking. Preferred feeding habitat: Forest interior, mainly in trees.

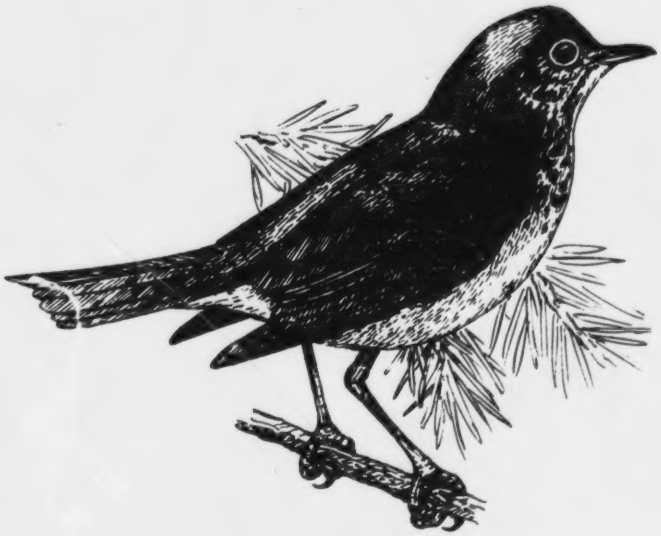
COMMENTS: Beal (1915 in Bent 1949:181) found that the March to November diet of 403 birds consisted of 64 percent animal and 36 percent vegetable matter.

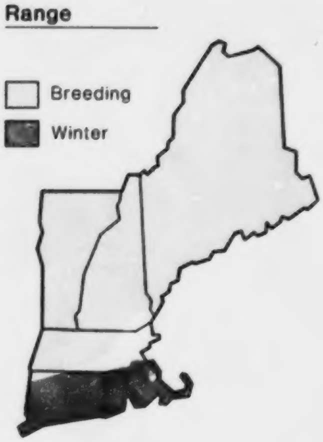
KEY REFERENCES: Bent 1949, Forbush 1929, Graber et al. 1971.

Hermit Thrush

(Catharus guttatus)

A.O.U. No. 759.0





RANGE: Breeding: Labrador w. to Alaska, s. to s. New York, the mountains of West Virginia and Maryland, c. Minnesota and through the Rockies to New Mexico. Winter: Southern Massachusetts, e. Pennsylvania and s. Ohio s. to Florida and Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon (Massachusetts).

HABITAT: Breeding: Lowlands in wooded swamps and damp forests and uplands in dry, brushy clearings in coniferous or mixed forests. Also frequents woodland edges and brushy pastures and cool north-facing slopes. Wintering: Borders of wooded swamps where birds find shelter in thick hummocks. Areas with persistent fruits on shrubs or vines or well-stocked feeding stations (New York) (Bull 1974:432).

SPECIAL HABITAT REQUIREMENTS: Coniferous or mixed woodlands with dense young undergrowth. In winter, birds require abundant native fruits.

NESTING: Egg dates: May 12 to August 24, New York (Bull 1974:431). Clutch size: 3 to 6, typically 3 or 4. Incubation period: 12 days. Nestling period: 12 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: typically on ground. Nest site: Usually on ground on a hummock, or in dense ferns or other cover, or under a low-hanging conifer limb. Occasionally to 4 feet (1.2 m) in a sapling.

SAMPLE DENSITIES: 40 to 93 birds per 100 acres (40 ha) in second-growth or cut-over woods (Fawks 1937, 1938). 20 birds per 100 acres (40 ha) in bottomland forest in Illinois (Karr 1968). 6 to 10 birds per 100 acres (40 ha) in upland forest in Illinois (Weise 1951 in Graber et al. 1971).

FORAGING: Major foods: Insects, fruits. Substrate: Leaf litter. Technique: Ground gleaning.

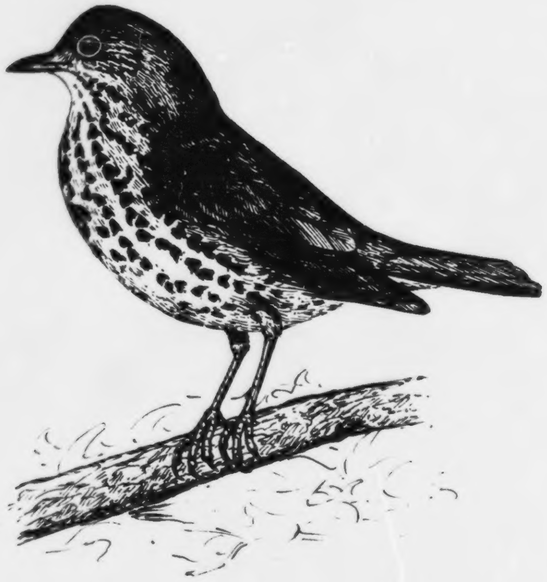
COMMENTS: Beal (1915 in Bent 1949:153) found the stomach contents of 551 Hermit Thrushes contained 65 percent animal and 35 percent vegetable matter. Birds switch to mainly vegetable materials in fall and winter (berries and buds).

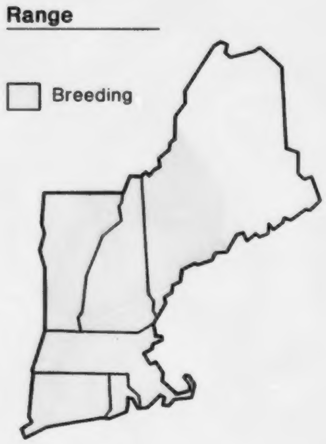
KEY REFERENCES: Bent 1949, Dilger 1956, Graber et al. 1971, Morse 1972.

Wood Thrush

(Hylocichla mustelina)

A.O.U. No. 755.0





RANGE: Breeding: Maine w. to South Dakota, s. to Florida and Texas. Winter: Mexico and Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Mature lowland forests (mainly deciduous or mixed); shady, cool, mature upland forests, often near a swamp, pond, stream, or lake; sometimes in residential areas. Requires abundant undergrowth. Absent from higher mountains of New England.

SPECIAL HABITAT REQUIREMENTS: Deciduous or mixed forests with tall trees and abundant sapling growth. Cool, mosit conditions. Apparently requires a tree at least 40 feet (12 m), possibly for song perches (Bertin 1977).

NESTING: Egg dates: May 17 to July 7, New York (Bull 1974-429). Clutch size: 2 to 5, typically 3 or 4. Incubation period: 13 to 14 days. Nestling period: 12 to 14 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: 5 to 50 feet, (1.5 to 15.2 m), typically 5 to 12 feet (1.5 to 3.7 m). Nest site: In a fork or saddled on a horizontal limb of a sapling or tree (often elm or maple), or well hidden in dense shrubbery.

TERRITORY SIZE: 0.2 to 2 acres (0.08 to 0.8 ha) (Weaver 1939). 2 to 7 acres (0.8 to 2.8 ha) in forested habitat in central Illinois (Graber et al. 1971). 1.4 acres (0.6 ha) in woodland edge in Kansas (Fitch 1958).

SAMPLE DENSITIES: Maryland—40 territorial males per 100 acres (40 ha) in virgin hardwood deciduous forest. 16 territorial males per 100 (40 ha) in shrub swamp. 11 territorial males per 100 acres (40 ha) in mature northern hardwood forest. 10 territorial males per 100 acres (40 ha) in mixed oak forest. 4 territorial males per 100 acres (40 ha) in pine-oak forest (Stewart and Robbins 1958:246).

FORAGING: Major foods: Insects, fruits. Substrates: leaf litter on ground, understory vegetation. Techniques: Ground gleaning, scratching, turning leaves over with bill.

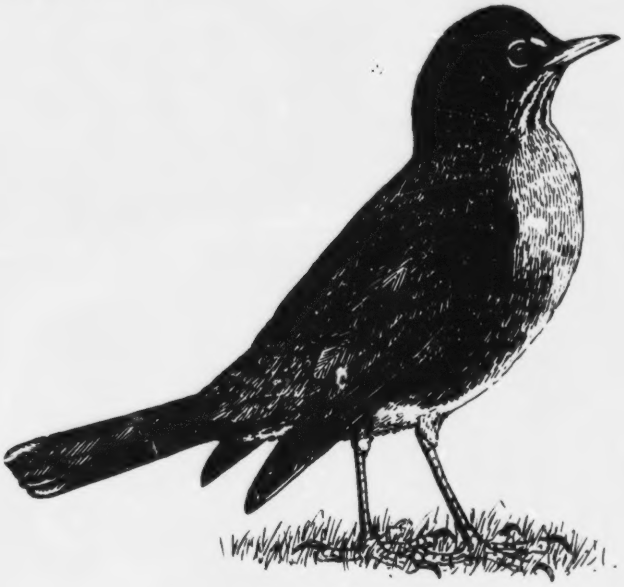
COMMENTS: Stomach analyses revealed a diet of 62 percent animal and 38 percent vegetable matter (Bent 1949:113).

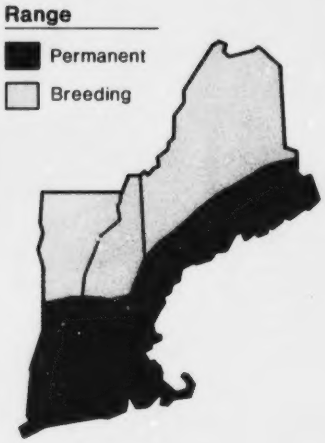
KEY REFERENCES: Bent 1949, Bertin 1977, Dilger 1956, Graber et al, 1971, Longcore and Jones 1969.

American Robin

(Turdus migratorius)

A.O.U. No. 761.0





RANGE: Breeding: Newfoundland w. to Alaska, s. to South Carolina, Texas, Mexico and s. California. Winter: Southern Maine w. to British Columbia, s. to Mexico and Gulf Coast.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Breeding: Open woodlands and woodland edges and clearings, fields, orchards, shade trees in residential areas. Densities are frequently greater in residential areas than in the wild (Pough 1949:113), though urban populations may not be self-supporting (Howard 1974). Wintering: Frequents sheltered wooded areas more than open exposed pasturelands. Roosts among evergreens in swamps and feeds on persistent wild and cultivated fruits.

NESTING: Egg dates: March 23 to July 19, New York (Bull 1974:428). Clutch size: 2 to 7, typically 3 or 4. Incubation period: 11 to 14 days. Nestling period: 14 to 16 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: to 70 feet. (21.3 m), typically 5 to 15 feet. (1.5 to 4.5 m). Nest site: Robins use a variety of sites for nesting. They prefer to build on a horizontal branch or in a fork of a tree but commonly use shrubs and ledges of buildings. First nest of season is often in a conifer and successive nests in hardwoods. White pine, maple, and apple trees are preferred nest trees (DeGraaf et al. 1975).

TERRITORY SIZE: 0.30 to 0.75 acre (0.1 to 0.03 ha) (Collins and Boyajian 1965:133). 0.11 to 0.60 acres (0.4 to 0.24 ha) (average 0.30 acres (0.1 ha)) in Wisconsin (Young 1951).

SAMPLE DENSITIES: 132 birds per 100 acres (40 ha) in urban residential areas in Illinois (Graber et al. 1971). 56 birds per 100 acres (40 ha) in edge shrubbery in central Illinois (Graber et al. 1971. 14 birds per 100 acres (40 ha) in second growth or cut-over woods in Illinois (Fawks 1937, 1938).

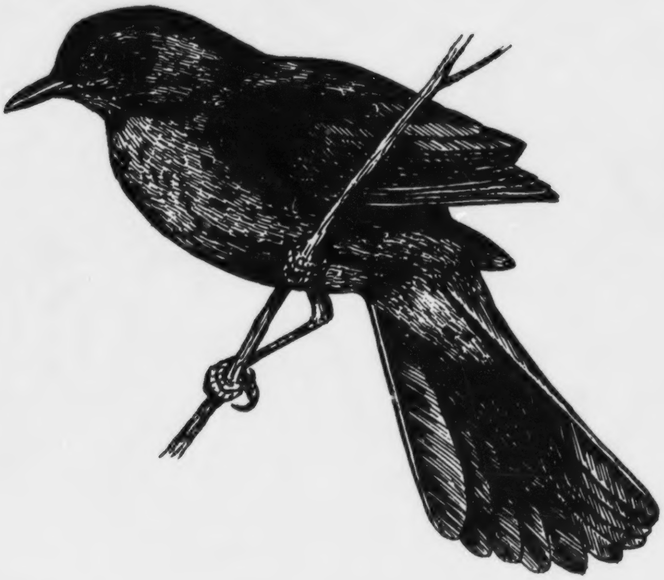
FORAGING: Major foods: Wild and cultivated fruits, earthworms, insects. Substrates: Rich loamy soil, fruit-bearing trees, shrubs and vines. Techniques: Running, pausing and seizing prey, gleaning. Preferred feeding habitat: Grassy fields, orchards, lawns, gardens.

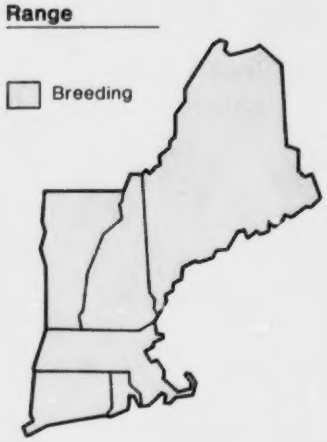
COMMENTS: A study of banding returns by Hickey (1943) indicated that almost three-fourths of the young robins that survived their first winter returned to nest within 16 km (10 miles) of their birthplaces. About 60 percent of the diet is vegetable matter and 40 percent animal matter (Bent 1949:25).

KEY REFERENCES: Bent 1949, Graber et al. 1971, Howard 1974, Howell 1942, Nickell 1944, Young 1955.

Gray Catbird
(Dumetella carolinensis)

A.O.U. No. 704.0





RANGE: Breeding: Nova Scotia w. to British Columbia, s. to Florida and New Mexico. Winter: Coastal sections from Long Island (a few) s. to Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in breeding season.

HABITAT: Breeding: Dense thickets of shrubs, briars, vines along woodland borders, lowland tangles near streams, ponds and swamps, shrubbery around buildings especially in hedgerows and gardens, forest clearings with brushy edges. Rare at high elevations. Wintering: Milder coastal regions where persistent fruits are available throughout the winter.

SPECIAL HABITAT REQUIREMENTS: Low, dense, woody vegetation for nesting, usually with an overtopping deciduous tree layer 10 to 30 feet (3 to 9 m) above (DeGraaf 1975).

NESTING: Egg dates: May 5 to June 13, New York (Bull 1974:422). Clutch size: 3 to 5, typically 4. Incubation period: 12 to 15 days. Nestling period: 9 to 15 days, typically 11 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: 3 to 10 feet (0.9 to 3.0 m). Typically 5 feet (1.5 m). Nest site: Builds in dense thickets of briars, vines, shrubs or low trees. Nests are typically well hidden by foliage. Grape vines, hawthorns, and multiflora rose are favored sites.

HOME RANGE: 0.16 to 0.36 acres (0.06 to 0.1 ha) (average 0.26 acre (0.1 ha)) in swamp-thicket in Illinois (Brewer 1955).

SAMPLE DENSITIES: 1 nest per 8 acres (3.2 ha) in mixed shrub—small tree habitat within beech-maple-hemlock community in New York (Kendeigh 1946). 40 pairs per square mile (15 pairs/km^2) (maximum density) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 80 territorial males per 100 acres (40 ha) in shrub swamp. 35 territorial males per 100 acres (40 ha) in brushy abandoned farmland in Maryland (Stewart and Robbins 1958:241).

FORAGING: Major foods: Small fruits, insects. Substrates: Fruit-bearing shrubs, leaf litter on ground. Technique: Ground gleaning.

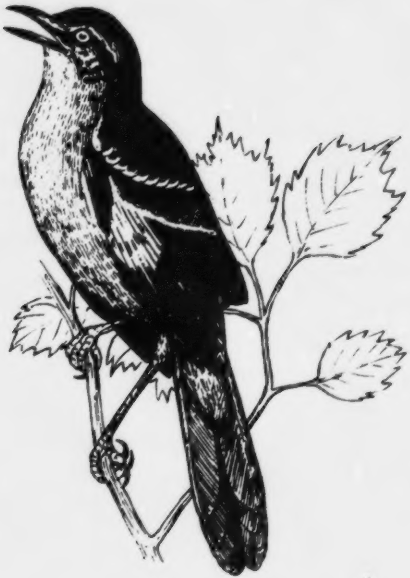
COMMENTS: Catbirds use a variety of habitats. Tree and shrub associations are not as important as edge and density of vegetation within the edges (Nickell 1965). Forest edge is preferred to hedgerows in open (Graber et al. 1970).

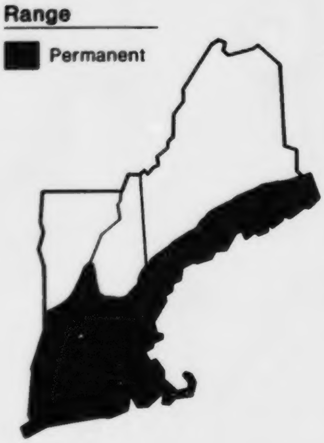
KEY REFERENCES: Bent 1948, Graber et al. 1970, Nickell 1965.

Northern Mockingbird

(Mimus polyglottos)

A.O.U. No. 703.0





RANGE: Breeding: Southern Maine w. through Ohio to c. California, s. to the Gulf Coast and s. Mexico. Spreading n. Winter: Southern New England, s. and w.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Woodland edges, pastures with scattered fruit-bearing shrubs, small trees or groves of large trees, often in cities and habitat. Wintering: Similar to breeding habitat; among thickets that bear persistent fruits, especially multiflora rose.

SPECIAL HABITAT REQUIREMENTS: Low, dense woody vegetation, elevated perches, a variety of edible fruits.

NESTING: Egg dates: April 27 to July 21, New York (Bull 1974:425). Clutch size: 3 to 6, typically 4 or 5. Incubation period 14 days. Nestling period: 10 days (10 to 12 days in Tennessee (Laskey 1962)). Broods per year: 2. Age at sexual maturity: 1 year. Nest height: 1.5 to 10 feet (0.5 to 3.0 m). Typically 3 to 10 feet (0.9 to 3.0 m). Nest site: Usually in a thicket of shrubs or vines or in a dense tree (often an evergreen). Prefers sites near houses, especially porch vines, garden, lawn and foundation plantings. Prefers to nest in multiflora rose (DeGraaf et al. 1975).

TERRITORY SIZE: Territories of 5 pairs of mockingbirds ranged from 26,650 to 60,000 square feet (2,475.5 to 5,573.3 m^2) (Michener and Michener 1935). Winter: four females defended areas that ranged from 3,750 to 20,000 square feet (348.3 to 1857.8 m^2) (Michener and Michener 1935).

HOME RANGE: 2 pairs in Michigan occupied home ranges of 45 acres (18.2 ha) compared with an average of 2.5 acres (1.0 ha) in Tennessee (Adkisson 1966:104).

SAMPLE DENSITIES: Maryland: 15 territorial males per 100 acres (40 ha) in suburban-residential habitat. 2 territorial males per 100 acres (40 ha) in mixed agricultural habitats (Stewart and Robbins 1958:239).

FORAGING: Major foods: Wild or cultivated fruits, seeds, insects. Substrates: Ground litter and grasses, shrubs, trees. Techniques: Ground, shrub gleaning.

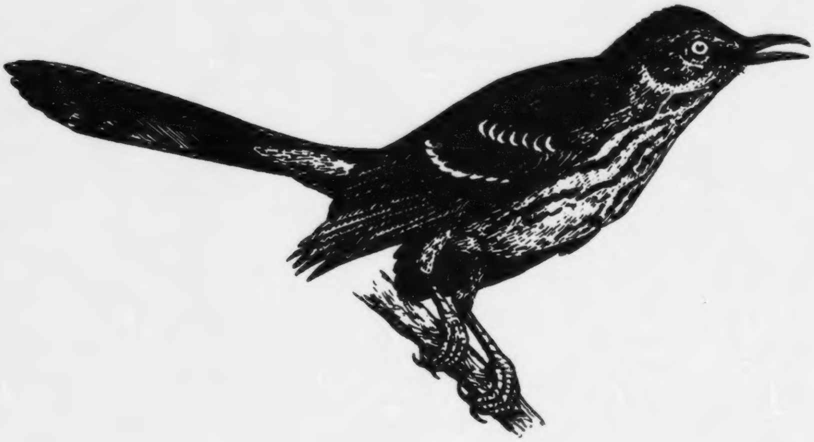
COMMENTS: Studies by Beal and others (1916) revealed that in May the bulk of the diet consists of animal matter (85 percent) and in December and January mockingbirds eat mainly vegetable matter (87 percent) (Bent 1948:305).

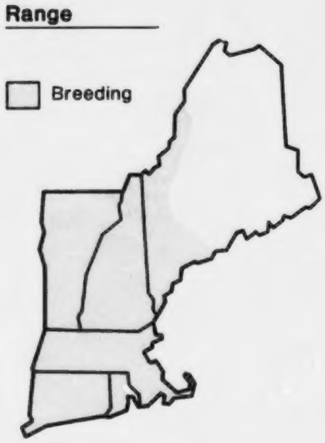
KEY REFERENCES: Bent 1948, Laskey 1962, Michener and Michener 1935.

Brown Thrasher

(Toxostoma rufum)

A.O.U. No. 705.0





RANGE: Breeding: Maine w. to s. Alberta s. to Florida and the Gulf Coast. Winter: Long Island and coastal sections of New Jersey s. to Maryland, coastal and inland Virginia to Missouri s. to Florida and Texas

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine).

HABITAT: Breeding: Bushes, low trees, tangle of vines in open pastures or woodland edges and clearings in early stages of second growth. Hedgerows along roadsides and fields are preferred (Graber et al. 1970). Absent from higher mountains of New England. Wintering: Coastal areas where climate is mild and sparse snow cover allows birds to find fruits.

SPECIAL HABITAT REQUIREMENTS: Low, dense woody vegetation for nesting and cover (Graber et al. 1970).

NESTING: Egg dates: May 6 to June 26, New York (Bull 1974:423). Clutch size: 3 to 6, typically 4. Incubation period: 12 to 13 days. Nestling period: 12 to 13 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: To 14 feet (4.3 m), typically 2 to 7 feet (0.6 to 2.1 m). Nest site: On ground or low in dense cover of a shrub or vine. Less often in a low tree.

TERRITORY SIZE: Average 1.6 acres (0.6 ha) in forest edge in Illinois (Graber et al. 1970).

SAMPLE DENSITIES: 3 pairs per 100 acres (40 ha) in forest edge (Holmes 1950 in Graber et al. 1970). 189 birds per 100 acres (40 ha) in hedgerows and 76 birds per 100 acres (40 ha) in edge shrubbery (Graber and Graber 1963). 86 birds per 100 acres (40 ha) in second-growth or cut-over woods (Fawks 1937).

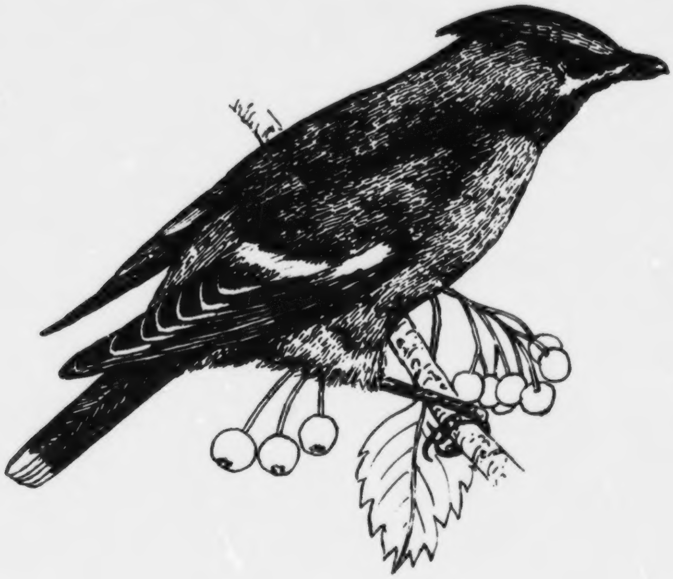
FORAGING: Major foods: Insects (about 66 percent; berries, mast (acorns), and grain (about 33 percent) (Pough 1949: 110). Substrates: Leaf litter, soft earth, low vegetation. Techniques: Ground and shrub gleaning.

KEY REFERENCES: Bent 1948, Erwin 1935, Graber et al 1970.

Bohemian Waxwing

(Bombycilla garrulus)

A.O.U. No. 618.0



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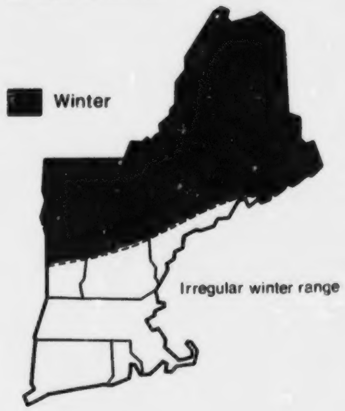


RANGE: Breeding: Boreal and temperate areas of North America. Winter: Irregularly to s. California, the Prairie States, and the Mid-Atlantic states.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare.

HABITAT: Unreported.

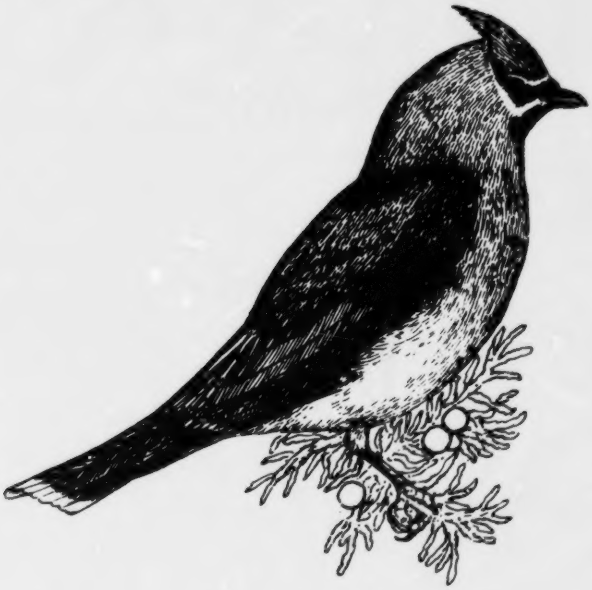
FORAGING: Major foods: Berries in winter. Substrate: Fruit-bearing trees and shrubs. Techniques: Gleaning.

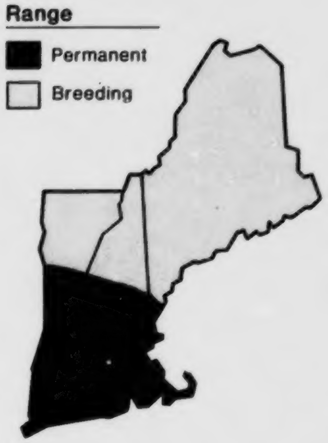
KEY REFERENCE: Forbush 1929.

Cedar Waxwing

(Bombycilla cedrorum)

A.O.U. No. 619.0





RANGE: Breeding: Nova Scotia, w. to British Columbia, s. to Georgia, New Mexico and n. California. Winter: Central New England, w. to Oregon, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Open deciduous and coniferous woodlands (avoids dense forests), orchards, shade trees. Semi-open country, commonly in agricultural areas and near water. Wintering: same.

NESTING: Egg dates: June 5 to September, New York (Bull 1974:450). Clutch size: 2 to 6, typically 4 or 5. Incubation period: 12 to 16 days. Nestling period: 12 to 18 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 4 to 50 feet (1.2 to 15.2 m). Typically 6 to 20 feet (1.8 to 6.1 m). Nest site: Prefers dense coniferous thickets (often cedar) but nests in a variety of deciduous trees and shrubs. Nest is placed on a horizontal limb, often in a crotch next to main trunk.

TERRITORY SIZE: 3 territories on an island in Lake Erie had the following areas: 0.06 acre, 0.5 acre and 0.23 acre (0.02, 0.2, and 0.09 ha) (Putnam 1949).

SAMPLE DENSITIES: 20 nests were found in a 2.3-acre (0.9-ha) white pine plantation in Michigan (Rothstein 1971). 11 nests were located within a radius of 25 feet (7.6 m) in Ontario (Harrison 1975:166). 16 pairs per 100 acres (40 ha) in open hemlock-spruce bog in Maryland (Stewart and Robbins 1958).

FORAGING: Major foods: Fresh and dried fruits and flowers (80 percent), insects (20 percent). Substrates: Leaf surfaces, fruit-bearing branches. Techniques: Gleaning, hawking.

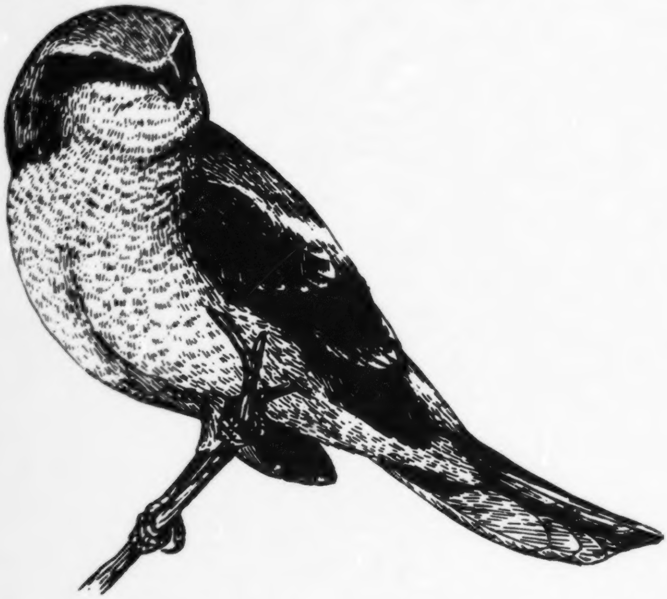
COMMENTS: Waxwings tend to nest late in summer when there is an abundant supply of wild fruits. Birds nest singly or in loose colonies. A second nest is often begun and eggs laid before the young in the first nest have fledged. During most of the year they roam the countryside in small to large flocks.

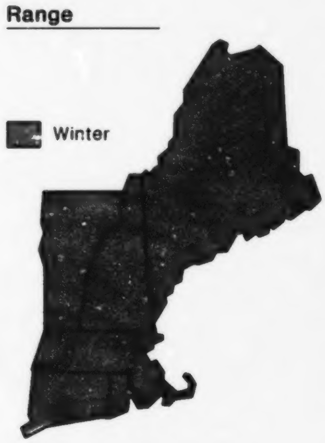
KEY REFERENCES: Bent 1950, Lea 1942, Putnam 1949.

Northern Shrike

(Lanius excubitor)

A.O.U. No. 621.0





RANGE: Breeding: Northern North America, s. to s. Canada. Winter: Same as above but occasionally wanders s. to Virginia, New Mexico and n. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare (winter).

HABITAT: Wintering: Semi-open country with short grasses and scattered trees or shrubs for perches. Fences and utility wires also used.

SPECIAL HABITAT REQUIREMENTS: Elevated perches, short vegetation.

FORAGING: Major foods: Rodents, especially mice, small birds. Substrates: Meadow grasses, air. Techniques: Hawking, diving and pouncing from a perch, hovering. Preferred feeding habitat: Open fields with scattered perches.

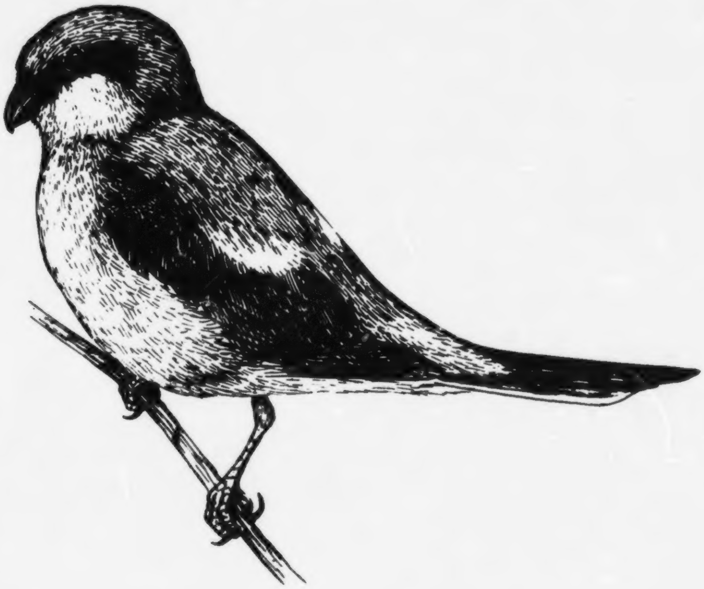
COMMENTS:Northern shrikes are seen in the Northeast in winter when northern rodent populations are low—about every 4 years (Pough 1949:133).

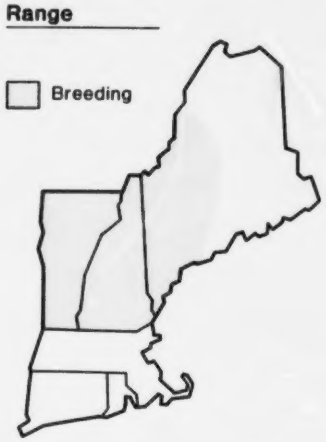
KEY REFERENCES: Bent 1950, Cade 1967, Miller 1931.

Loggerhead Shrike

(Lanius ludovicianus)

A.O.U. No. 622.0





RANGE: Breeding: New Brunswick, w. to British Columbia, s. to s. Florida and s. Mexico. Winter: s. New Jersey, w. to n. California, s. to s. Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and local breeder in Northeast.

HABITAT: Breeding: Open country with scattered trees, shrubs, roadside hedges. Is attracted to areas with thorny trees such as hawthorn and honey locust. Favors low elevations.

SPECIAL HABITAT REQUIREMENTS: Open areas with short grasses, elevated perches from which to spot prey.

NESTING: Egg dates: April 18 to June 28, New York (Bull 1974:453). Clutch size: 4 to 7, typically 4 or 5. Incubation period: 16 days. Nestling period: 16 to 20 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: 5 to 30 feet (1.5 to 9.1 m). Typically 8 to 15 feet (2.4 to 4.6 m). Nest site: Builds in the dense foliage of a tree or shrub. Prefers to nest in thorny plants but is known to nest in oaks, pines, orchard trees, and grapevine.

TERRITORY SIZE: 18.7 acres (7.6 ha) (Miller 1931).

SAMPLE DENSITIES: 1.9 nests per mile (1.6 km) of hedge in Illinois (Graber et al. 1973).

FORAGING: Major foods: Insects, small reptiles, amphibians, birds, and mammals. Substrate: Meadow grasses. Techniques: Hovering or perching and diving, hawking.

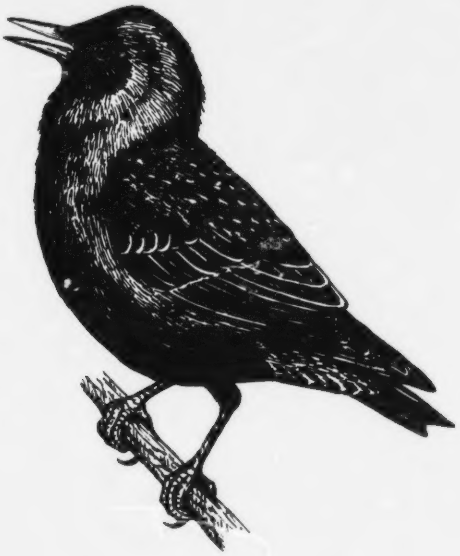
COMMENTS. Beal (1912 in Bent 1950:137) found that the contents of 88 stomachs held mainly animal matter (97.5 percent) and a trace of vegetable matter (2.5 percent). Shrikes habitually impale their prey in thorn trees or on barbed wire fences or hang the prey in the fork of a branch. Formerly nested in New Hampshire (C. Anderson, personal community).

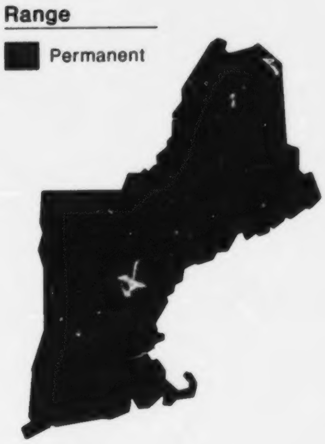
KEY REFERENCES: Bent 1950, Graber et al. 1973, Miller 1931.

European Starling

(Sturnus vulgaris)

A.O.U. No. 493.0





RANGE: Breeding: Southern half of Canada s. throughout most of United States except in extreme sw. portions, though now invading n. Sonoran Desert. Winter: Throughout United States.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Breeding: Farms, cities, orchards, gardens, parks. Prefers rural areas with pastures, cultivated fields and hayfields. Wintering: Roost in dense vegetation or on buildings in villages and cities. Probably absent from high mountains.

SPECIAL HABITAT REQUIREMENTS: Cavities for nesting. Minimum d.b.h. of trees suitable for nesting is 10 inches (25.4 cm) (Thomas et al. 1979).

NESTING: Egg dates: April 10 to June 15, New York (Bull 1974:541). Clutch size: 2 to 7, typically 4 to 6. Incubation period: 11 to 13 days. Nestling period: 18 to 22 days. Broods per year: 1 or 2. May be single-brooded north of 48° latitude (Kessel 1953). Age at sexual maturity: 1 year. Nest height: 2 to 60 feet (0.6 to 18.3 m). Typically 10 to 25 feet (3.0 to 7.6 m). Nest site: A cavity almost anywhere, including crevices created by highway construction in exposed rock ledges. Often in natural or existing excavated cavities in trees, barns and other buildings, drain pipes, cupolas.

TERRITORY SIZE: Birds defended a 10- to 20-inch (25.4 to 50.8 cm) radius around nest holes (Kessel 1957).

SAMPLE DENSITIES: 78 breeding females per square mile (20 breeding females/km^2) (some in nest boxes) on a farm in Scotland (Dunnet 1955).

FORAGING: Major food: Insects, seeds, fruits, cultivated grains. Substrates: Soil surface, sub-surface to depths not exceeding length of bill. Techniques: Ground gleaning, probing. Preferred feeding habitat: Lawns, meadows, grazed fields; starlings prefer to forage in low vegetation; feeds up to three-fourths of a mile from nest site (Kessel 1957).

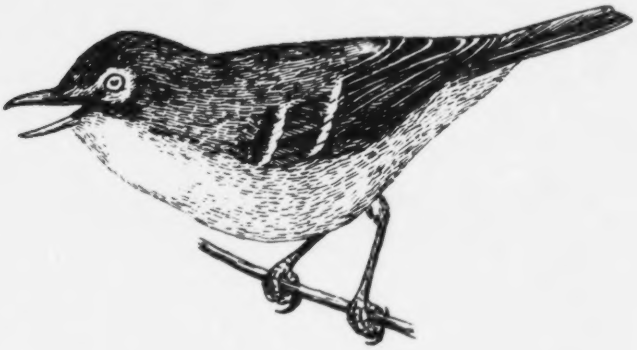
COMMENTS: Introduced from Europe, starlings are highly adaptable and compete successfully with other birds for nest cavities. Stomach analyses of 2,301 birds taken throughout the United States in all seasons revealed a diet of 57 percent animal and 43 percent vegetable matter (Kalmbach and Gabrielson 1921 in Bent 1950:194).

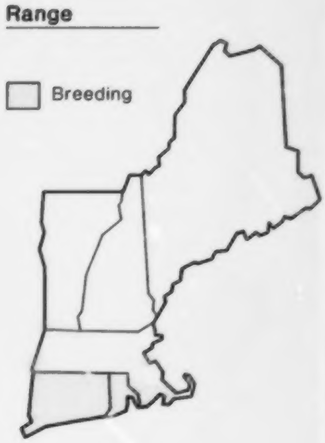
KEY REFERENCES: Dunnett 1955, Kessel 1957, Williamson and Gray 1975.

White-eyed Vireo

(Vireo griseus)

A.O.U. No. 631.0





RANGE: Breeding: Southern New England and se. New York, w. to Wisconsin and Nebraska, s. to Mexico and the Gulf Coast. Winter: South Carolina w. to s. Texas.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common (Long Island) to rare (Maine).

HABITAT: Breeding: Dense shrubby lowlands, briar patches, deciduous forest undergrowth and forest edges, hedgerows, old fields, low swampy areas. Less often on drier hillsides and along rural roads.

SPECIAL HABITAT REQUIREMENTS: Low shrubby vegetation that provides foraging and nesting substrates.

NESTING: Egg dates: May 17 to July 17, New York (Bull 1974:454). Clutch size: 3 to 5, typically 4. Incubation period: 14 to 15 days. Broods per year: 1 . Age at sexual maturity: 1 year. Nest height: 1 to 8 feet (0.3 to 2.4 m). Typically 2 to 6 feet (0.6 to 1.8 m). Nest site: Suspended from the fork of a low branch, usually well hidden by surrounding vegetation. Most often placed in a small sapling or shrub.

TERRITORY SIZE: Approximately 2.5 to 3.5 acres (1.0 to 1.4 ha) per male (Stewart and Robbins 1958). Territories may be as small as 0.33 (0.13 ha) acre per male (Brewer 1955). 6.5 and 5.4 acres (2.6 to 2.2 ha) in stream and woodland edge thickets in Kansas (Fitch 1958).

SAMPLE DENSITIES: Maryland—40 territorial males per 100 acres (40 ha) in shrub swamp. 32 territorial males per 100 acres (40 ha) in second-growth river swamp. 28 territorial males per 100 acres (40 ha) in brushy abandoned farmland (Stewart and Robbins 1958:263).

FORAGING: Major foods: Insects, wild fruits. Substrates: Branches and twigs, leaf surfaces. Techniques: Gleaning, hover-gleaning. Preferred feeding habitat: Feeds mainly in the inner canopy of trees and shrubs.

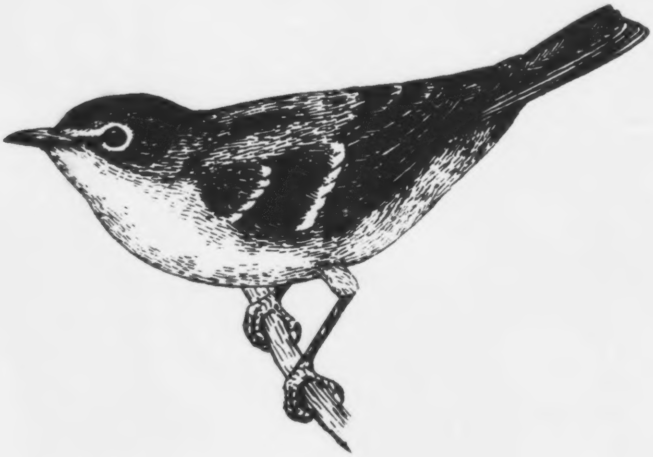
COMMENTS: The White-eyed Vireo prefers close-growing stands of trees 8 to 25 feet (2.4 to 7.6 m) tall (either saplings or mature low trees such as *Crataegus* spp.) (Nolan 1960). The bird is a common victim of cowbird parasitism.

KEY REFERENCES: Bent 1950, Nolan 1960, Saunders 1915.

Solitary Vireo

(Vireo solitarius)

A.O.U. No. 629.0



Range
☐ Breeding

RANGE: Breeding: Nova Scotia, w. to British Columbia, s. to Connecticut (uplands), Georgia (mountains), c. Minnesota and Mexico (mountains). Winter: South Carolina to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon (s. Connecticut).

HABITAT: Breeding: Coniferous or mixed woodlands especially those with openings [illegible] canopy and a dense understory. Shows preference for pine, hemlock, or spruce. Prefers mountain elevations but occurs locally in highlands.

NESTING: Egg dates: May 14 to July 22, New York (Bull 1974:459). Clutch size: 3 to 5, typically 4. Incubation period: 13 to 15 days. Nestling period: 15 to 17 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 3.5 to 20 feet (1.1 to 6.1 m). Typically less than 10 feet (3.0 m). Nest site: Suspended from a forked horizontal branch, usually a conifer.

SAMPLE DENSITIES: Average 29 birds per 100 acres (40 ha) in ponderosa pine forest in Colorado (Cruz 1975). 27 territorial males per 100 acres (40 ha) in virgin hemlock forest in Maryland. 17 territorial males per 100 acres (40 ha) in mature northern hardwood forest in Maryland (Stewart and Robbins 1958:265).

FORAGING: Major foods: Insects, especially moths and caterpillars, small amounts of fruits. Substrates: Bark of branches, often at bases of horizontal branches and dead stubs. Techniques: Gleaning, hover-gleaning, hawking. Preferred feeding habitat: Lower and middle canopy.

COMMENTS: Chapin (1925 in Bent 1950:296) found the bulk of diet (306 stomachs) to be animal matter (96 percent) supplemented by small amounts of vegetable matter (4 percent).

KEY REFERENCES: Bent 1950, Cruz 1975, James 1976.

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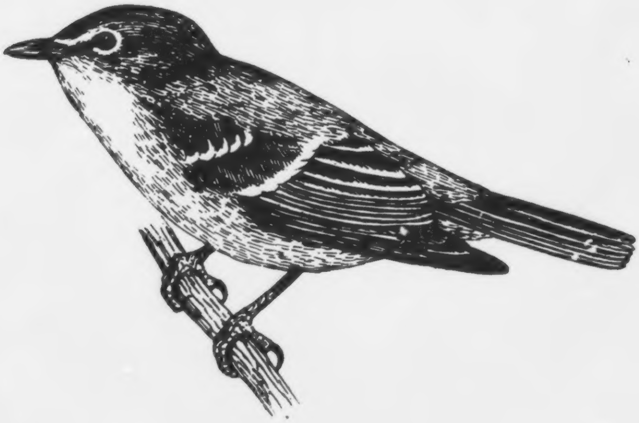
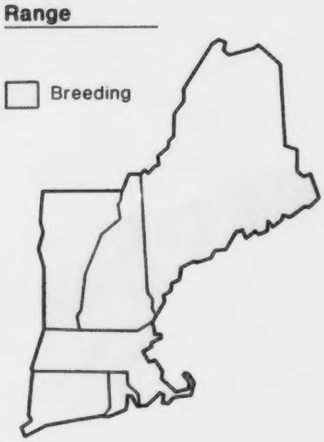
Yellow-throated Vireo

(Vireo flavifrons)

A.O.U. No. 628.0





RANGE: Breeding: Maine, w. to Saskatchewan, s. to Flordia and Texas. Winter: Southern Mexico to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare (Maine).

HABITAT: Breeding: Tall deciduous trees in woodlands with partially opened canopy, seldom in dense forests, rarely in conifers. Frequents roadsides, borders of streams, orchards and woodland borders, swampy woods.

SPECIAL HABITAT REQUIREMENTS: Tall deciduous trees.

NESTING: Egg dates: May 24 to June 18, New York (Bull 1974:457). Clutch size: 3 to 5, typically 4. Incubation period: 14 days. Nestling period: About 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 3 to 60 feet (0.9 to 18.3 m). Typically over 20 feet (6.1 m). Nest site: Suspended between a fork formed by slender branches of a horizontal limb, typically over 20 feet (6.1 m) above ground.

TERRITORY SIZE: About 10 acres (4.0 ha) (Robbins, unpublished data cited in Williamson 1971).

SAMPLE DENSITIES: Maryland: 19 territorial males per 100 acres (40 ha) in virgin hardwood deciduous forest. 8 territorial males per 100 acres (40 ha) in second growth river swamp. 7 territorial males per 100 acres (40 ha) in mixed oak forest. 3 territorial males per 100 acres (40 ha) in well-drained floodplain forest (Stewart and Robbins 1958:264).

FORAGING: Major foods: Insects, especially adult and larval moths. Substrates: Twig and branch surfaces, less often on leaf surfaces. Techniques: Gleaning—typically feeds slowly and deliberately, occasionally hovering or hawking. Preferred feeding habitat: Top of canopy (upper half), periphery and central portions (Williamson 1971).

COMMENTS: Chapin (1925 in Williamson 1971) found that the diet over a 1-year period consisted of 98 percent animal and 2 percent vegetable matter.

KEY REFERENCES: Bent 1950, James 1976, Williamson 1971.

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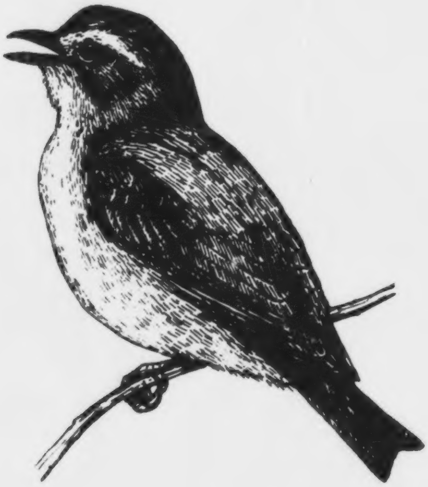
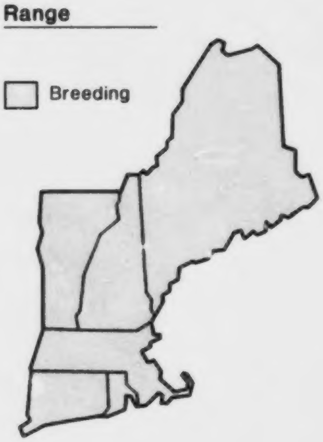
Warbling Vireo

(Vireo gilvus)

A.O.U. No. 627.0





RANGE: Breeding: Nova Scotia, w. to British Columbia, s. to North Carolina, n. Mexico and s. California. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon and widespread.

HABITAT: Breeding: Open mixed or deciduous woodlands, roadside and village shade trees, riverbottoms with mature trees, orchards. Avoids high elevations.

SPECIAL HABITAT REQUIREMENTS: Deciduous trees.

NESTING: Egg dates: May 16 to June 16, New York (Bull 1974:462). Clutch size: 3 to 5, typically 4. Incubation period: about 12 days. Nestling period: About 16 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 20 to 90 feet (6.1 to 27.4 m). Nest site: In horizontal fork of a slender branch usually well away from trunk. Typically protected by a canopy of leaves. Usually nests higher than other Vireos.

SAMPLE DENSITIES: 10 territorial males per 100 acres (40 ha) in field with shrubs and stream-bordered trees in Maryland (Stewart and Robbins 1958:269).

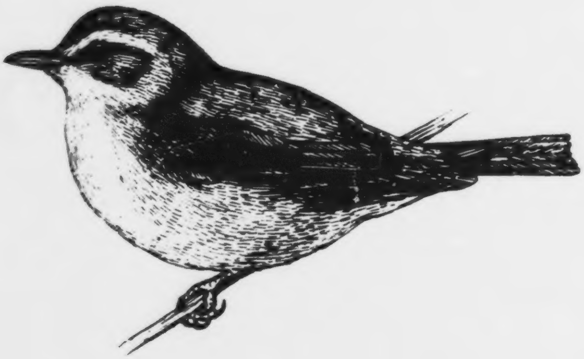
FORAGING: Major foods: Insects, especially caterpillars. Substrates: Leaf surfaces. Techniques: Flight-gleaning, gleaning. Preferred feeding habitat: Middle and upper canopy of tall deciduous trees, largely on branch tips.

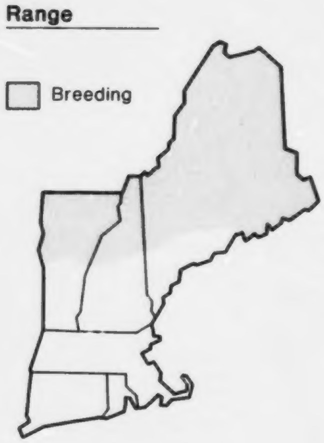
KEY REFERENCES: Bent 1950, James 1976.

Philadelphia Vireo

(Vireo philadelphicus)

A.O.U. No. 626.0





Range: Breeding: New Brunswick, w. to Alberta, s. to n. New England (rarely), Michigan and North Dakota. Winter: Central America.

Relative Abundance in New England: Uncommon (Maine).

Habitat: Breeding: Deciduous, coniferous or mixed forests, woodland edges, clearings, and burned-over areas with young deciduous second growth, neglected farmlands grown up to small trees and tall shrubs interspersed with clearings, willow and alder thickets along streams. Rarely in villages.

Special Habitat Requirements: Deciduous trees for nesting.

Nesting: Egg dates: June 15 to July 15, Maine (Bent 1950:362). Clutch size: 3 to 5, typically 4. Incubation period: 14 days. Nestling period: 13 days. Brood per year: 1 Age at sexual maturity: 1 year. Nest height: 10 to 40 feet (3.0 to 12.2 m). Nest site: Nest is hung in the fork a slender horizontal twig of a deciduous tree or shrub.

Foraging: Major foods: Insects, especially caterpillars; some wild fruits in autumn (less than 10 percent). Substrates: Leaf surfaces, branches. Techniques: Flight-gleaning, gleaning, hawking. Preferred feeding habitat: Tree tops, dense shrubbery.

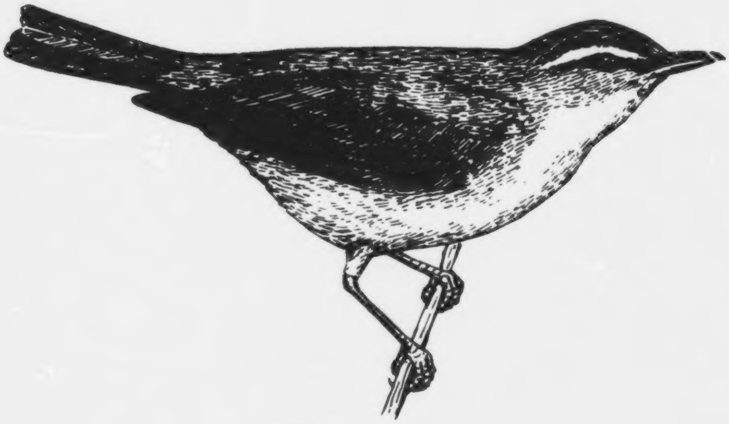
Comments: Animal matter represented 73 percent of the diet during the breeding season (McAtee 1926 in Bent 1950:356).

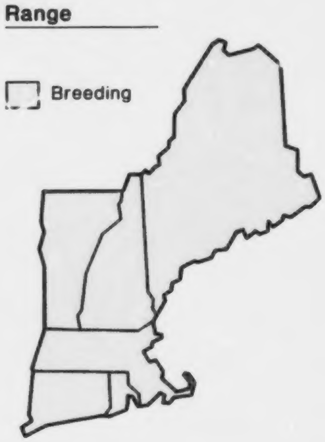
Key References: Bent 1950. Lewis 1921.

Red-eyed Vireo

(Vireo olivaceus)

A.O.U. No. 624.0





RANGE: Breeding: Quebec, w. to British Columbia, s. to Florida and s. South America. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Breeding: Open deciduous and second-growth woodlands (less often in mixed woods) with thick undergrowth of saplings. Frequents residential areas with abundant shade trees that provide a continuous canopy. Ubiquitous and common in deciduous woodland, yet shows preference for mesic stands in the deciduous forest (Bond 1957).

SPECIAL HABITAT REQUIREMENTS: Deciduous trees. A continuous canopy rather than presence of an understory may be the chief habitat requirement (Lawrence 1953).

NESTING: Egg dates: May 13 to July 7, New York (Bull 1974:459). Clutch size: 2 to 5, typically 4. Incubation period: 12 to 14 days. Nestling period: 10 to 12 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 2 to 60 feet (0.6 to 18.3 m). Typically 5 to 10 feet (1.5 to 3.0 m) DeGraaf and others (1975) found Red-eyed Vireos (n = 20) nesting at an average height of 17 feet (5.2 m) in a nest site study in Massachusetts. Nest site: Suspended in the fork of a horizontal limb often in a sapling, usually in a peripheral area of canopy.

TERRITORY SIZE: 45 territories in Michigan averaged 1.7 acres (0.7 ha) per pair (Harrison 1975:172). 5 territories in mixed woods in Ontario ranged from 0.7 to 2.4 acres (0.3 to 1.2 ha) (average 1.4 acres (0.6 ha)) (Lawrence 1953).

SAMPLE DENSITIES: Maryland — 60 territorial males per 100 acres (40 ha) in mature northern hardwood forest. 100 territorial males per 100 acres (40 ha) in virgin hardwood deciduous forest. 52 territorial males per 100 acres (40 ha) in dense second-growth forest. 34 territorial males per 100 acres (40 ha) in pine-oak forest. 10 territorial males per 100 acres (40 ha) in open slash area (Stewart and Robbins 1958:266).

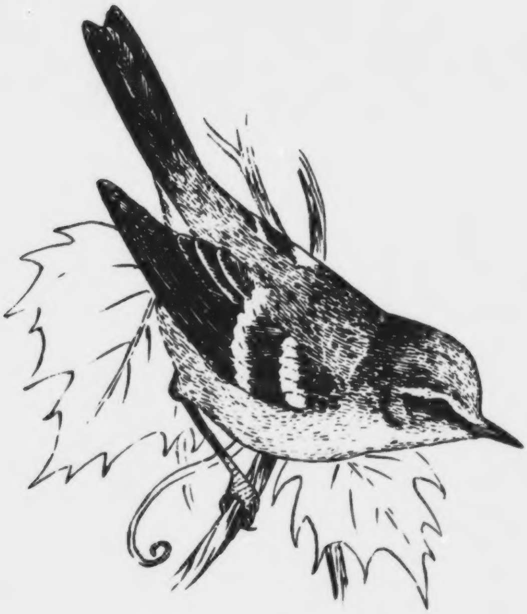
FORAGING: Major foods: Insects (more than 85 percent of diet), mainly caterpillars, moths, beetles, bugs, ants. Substrates: Leaf surfaces, especially undersides. Techniques: Gleaning, flight-gleaning, hawking (uncommon), glides rather than hops from branch to branch. Preferred feeding habitat: Uppermost branches of trees; most feeding occurs in periphery of middle and upper canopy; little feeding takes place in core.

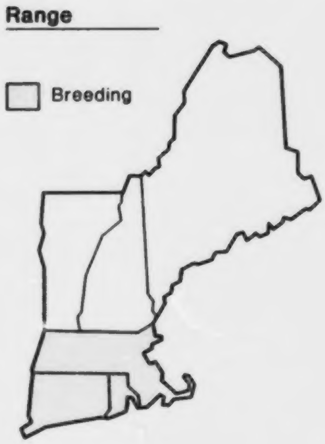
KEY REFERENCES: Bent 1950, James 1976, Lawrence 1953, Southern 1958, Williamson 1971.

Blue-winged Warbler

(Vermivora pinus)

A.O.U. No. 641.0





RANGE: Breeding: Southern Wisconsin, s. Michigan, n. Ohio, w. Pennsylvania, w. and se. New York, s. New England, s. to s. Illinois, c. Tennesse, Kentucky, n. Alabama, n. Georgia, North Carolina, n. Virginia, ne. Maryland, Delaware. Winter: Winters from s. Mexico to Guatemala, and Nicaragua and casually to Panama and Colombia; also w. Cuba.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to locally common.

HABITAT: Breeding: Edges of woods, bushy overgrown fields or borders of wooded swamps. Prefers old fields with saplings greater than 10 feet tall (Robbins et al. 1966:254). Often near streams.

SPECIAL HABITAT REQUIREMENTS: Old fields with scattered shrubs and small trees.

NESTING: Egg dates: May 18 to June 17, New York (Bull 1974:468). Clutch size: 4 to 7, typically 5. Incubation period: 10 to 12 days. Nestling period: 8 to 10 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: On the ground on a foundation of dry leaves, surrounded by bushes or tangles of vines and grasses.

TERRITORY SIZE: Less than 1 acre (0.4 ha) to almost 2 acres (0.8 ha) per pair (New York) (Ficken and Ficken 1968). Burke Lake, Michigan (2.0 ha (5 acres) per pair) — habitat: an extensive tamarack swamp surrounded by higher, drier oak-hickory woods. Island Lake, Michigan (1.3 ha (4.6 acres) per pair) — habitat: a low swamp of tamarack, poison sumac, red osier and gray dogwoods and poplars (Murray and Gill 1976).

FORAGING: Major foods: Caterpillars, beetles, ants, spiders. Substrates: Branches at tops of trees. Techniques: Twig and leaf gleaning.

KEY REFERENCES: Bent 1953, Short, 1962.

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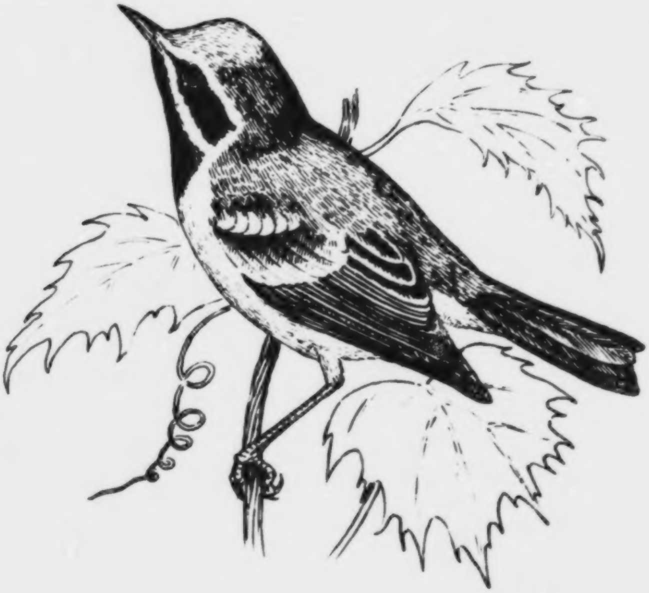
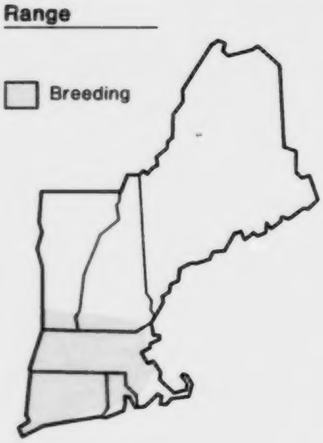
Golden-winged Warbler

(Vermivora chrysoptera)

A.O.U. No. 642.0





RANGE: Breeding: Wisconsin, s. Michigan, c. New York, s. Connecticut, c. Massachusetts, s. Vermont, s. to n. Illinois, n. Indiana, s. Ohio, w. Pennsylvania, n. New Jersey; in mountains to n. Georgia. Winter: Winters from Guatemala s. to n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare (Vermont).

HABITAT: Breeding: Damp fields heavily vegetated with thick grass, clumps of bushes and briars, deciduous damp woods, especially gray birch stands; sometimes found on higher ground. Avoids mountains.

SPECIAL HABITAT REQUIREMENTS: Brushy open areas, especially clearings in deciduous woodlands with saplings, forbs, grasses.

NESTING: Egg dates: May 18 to June 16, New York (Bull 1974:469). Clutch size: 4 to 6, typically 5. Incubation period: 10 days. Nestling period: 10 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: On the ground generally supported by a base of dead leaves and weed stalks.

TERRITORY SIZE: Less than 1 acre (0.4 ha) to almost 2 acres (0.8 ha) per pair (New York) (Ficken and Ficken 1968). Territories usually consisted of overgrown fields with many shrubs and small trees (under 20 feet) (6.0 m), bordered by taller deciduous trees. Burke Lake, Michigan (2.7 ha (6.7 acres) per pair) — habitat: an extensive tamarack swamp surrounded by higher, drier oak-hickory woods. Island Lake, Michigan (1.9 ha (4.7 acres) per pair) — habitat: a low swamp of tamarack, poison sumac, red osier and gray dogwood and poplars (Murray and Gill 1976).

SAMPLE DENSITY: 17 territorial males per 100 acres (40 ha) in dense second-growth forest in Maryland (Stewart and Robbins 1958:276).

FORAGING: Major foods: Small bugs and larvae, cankerworms, spiders. Substrates: Terminal twigs of high branches in tall trees. Techniques: Twig hopping and gleaning.

COMMENTS: Chickadee-like in feeding habits. Occupies similar habitat as Blue-winged Warbler with which it interbreeds. Golden-winged Warblers may breed at higher elevations and slightly farther north than Blue-winged Warblers (Bull 1974:469).

KEY REFERENCES: Griscom and Sprunt 1957, Short 1962.

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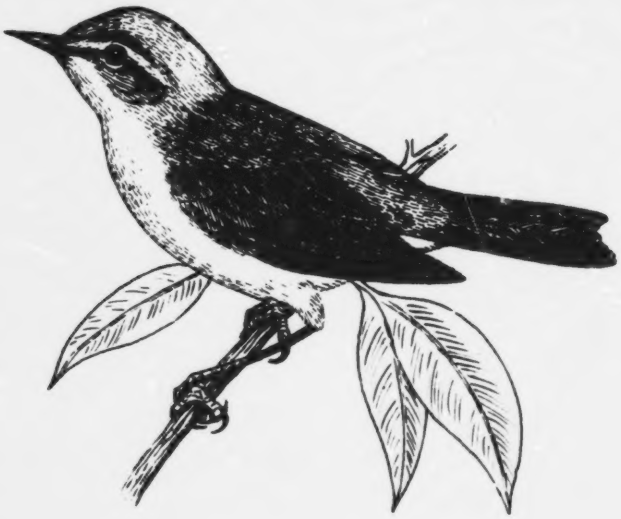
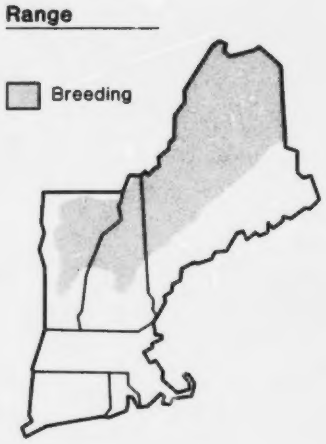
Tennessee Warbler

(Vermivora peregrina)

A.O.U. No. 647.0





RANGE: Breeding: Northern border of United States s. to n. Wisconsin, n. Michigan, ne. New York, s. Vermont, c. New Hampshire, s. Maine. Winter: From Guatemala e. to w. Colombia and n. Venezuela.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) (Bull 1974:475)).

HABITAT: Breeding: Associated with openings in northern deciduous or mixed woodlands with grasses, dense shrubs, and scattered clumps of young deciduous trees (Pough 1949:156). Often in boggy areas, occasionally on dry pine lands.

SPECIAL HABITAT REQUIREMENTS: Brushy, semi-open country.

NESTING: Egg dates: June 10 to July 10. Peak: June 17 to June 26, New Brunswick (Bent 1953:89). Clutch size: 4 to 7, typically 6. Incubation period: 11 to 12 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: On moist ground, in moss or grass, often at base of shrub. Is usually well concealed.

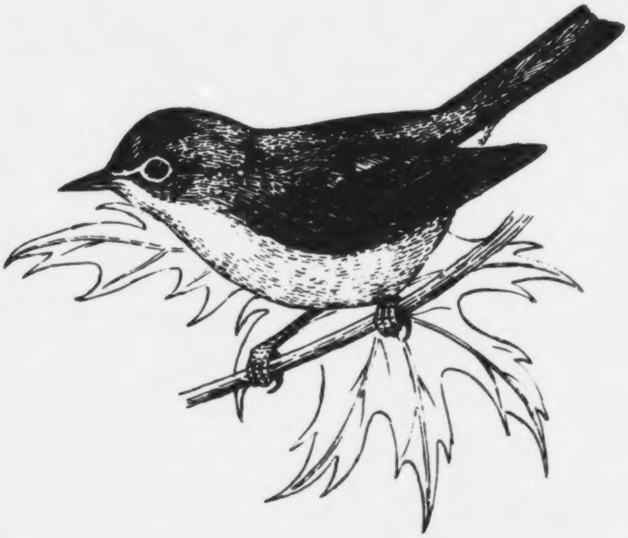
FORAGING: Major foods: Almost entirely insectivorous, takes weevils, flies, plant-lice, grasshoppers, caterpillars, grubs, beetles, spiders, some fruit. Substrates: The terminal foliage of trees, generally feeding to 40 feet (12.2 m) high (MacArthur 1958). Techniques: Branch hopping and foliage gleaning.

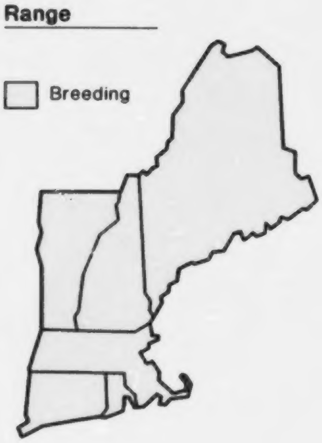
KEY REFERENCES: Bent 1953, Bowdish and Philipp 1916, Forbush 1929.

Nashville Warbler

(Vermivora ruficapilla)

A.O.U. No. 645.0





RANGE: Breeding: Southern Canada and n. United States. In the Northeast the range extends s. to Maryland (mountains) and rarely to Connecticut and Long Island. Winter: Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Moist open deciduous woods, overgrown pastures and fields, swampy areas, edges of woodlands, clearings with much young second-growth vegetation, especially young trees 10 to 12 feet tall (Pough 1949:158). Birds reportedly breed in both dry and moist situations, favoring spruce-sphagnum bogs in central New York (Bull 1974:477).

SPECIAL HABITAT REQUIREMENTS: Scattered trees interspersed with brush.

NESTING: Egg dates: May 19 to June 10, New York (Bull 1974:477). Clutch size: 3 to 5. Incubation period: 11 days. Nestling period: 11 to 12 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Depression in moss or beneath canopy of dried, dead bracken fern; well hidden.

TERRITORY SIZE: About 1/2 acre (0.2 ha) per pair in Ontario (Lawrence 1948).

SAMPLE DENSITIES: 39 territorial males per 100 acres (40 ha) in scrub spruce bog in Maryland. 21 territorial males per 100 acres (40 ha) in open hemlock-spruce bog in Maryland (Stewart and Robbins 1958:280).

FORAGING: Major foods: Adults, larvae, and eggs of various insects including small grasshoppers, plant-lice, caterpillars, and beetles. Substrates: Trunks, branches, and leaves of trees. Techniques: Hopping from bottom to the top of a tree hawking insects encountered.

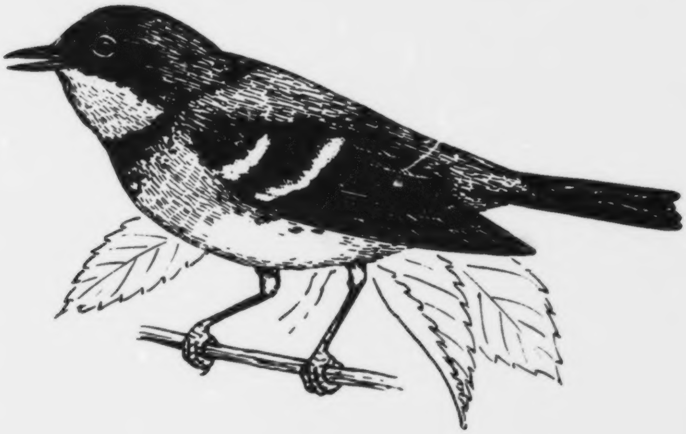
COMMENTS: Flying insects sometimes taken in flycatcher fashion; mostly insectivorous (Griscom 1957:83).

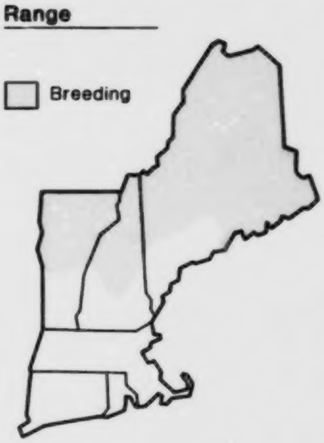
KEY REFERENCES: Bent 1953, Forbush 1929, Griscom and Sprunt 1957, Lawrence 1948.

Northern Parula

(Parula americana)

A.O.U. No. 648.0





RANGE: Breeding: Southern Canada to the Gulf States. Winter: Central America and the West Indies.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine).

HABITAT: Breeding: Wooded bogs, swamps, prefers conifers in areas where bearded lichen (*Usnea*) grows.

SPECIAL HABITAT REQUIREMENTS: Prefers to nest in bearded lichen or use the lichen as nesting material.

NESTING: Egg dates: May 17 to June 27, New York (Bull 1974:480). Clutch size: 3 to 7, typically 4 or 5. Incubation period: 12 to 14 days. Nestling period: 11 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 6 to 100 feet (1.8 to 30.5 m). Nest site: Usually hanging near the distal end of a limb that is covered with *Usnea*.

SAMPLE DENSITIES: Maryland — 47 territorial males per 100 acres (40 ha) in well-drained floodplain forest. 29 territorial males per 100 acres (40 ha) in poorly drained floodplain forest. 19 territorial males per 100 acres (40 ha) in second-growth river swamp. 12 territorial males per 100 acres (40 ha) in pine-oak forest (Stewart and Robbins 1958:281).

FORAGING: Major foods: Beetles, plant-lice, inchworms, small hairy caterpillars, spiders. Substrates: Branches, twigs, and leaves of trees. Techniques: Foliage and twig gleaning — often hangs upside down, chickadee fashion.

COMMENTS: Composition of diet is 98 percent animal, 2 percent vegetable (Wetmore 1916 in Bent 1953:143).

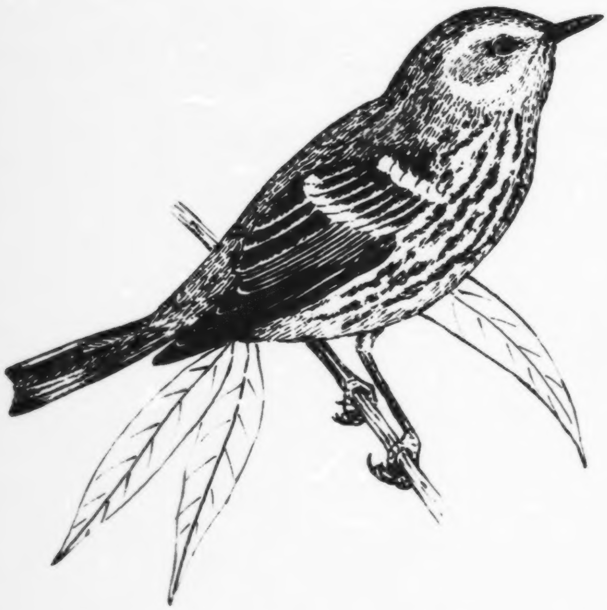
KEY REFERENCES: Bent 1953, Forbush 1929, Graber and Graber 1951.

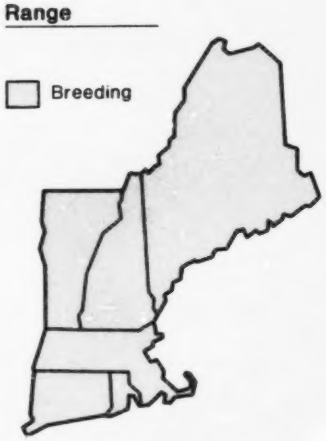
BEST COPY AVAILABLE

Yellow Warbler

(Dendroica petechia)

A.O.U. No. 652.0





RANGE: Breeding: Canada and Alaska to n. South America. Winter: Central and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Farmlands, orchards, roadsides and along streams and lakes.

SPECIAL HABITAT REQUIREMENTS: Scattered small trees or dense shrubbery.

NESTING: Egg dates: May 15 to July 3, New York (Bull 1974:481). Clutch size: 3 to 5, typically 4 or 5. Incubation period: 10 or 11 days. Nestling period: 9 to 12 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 2 to 15 feet (0.6 to 4.6 m). Typically 3 to 8 feet (0.9 to 2.4 m). DeGraaf and others (1975) found 19 Yellow Warbler nests at an average height of 22 feet (6.6 m) in five habitat types ranging from rural to urban in Massachusetts. Nest site: Securely placed in a fork or crotch of a shrub, sapling, or tree; often in stream-side thickets and shrubbery associated with suburban gardens. Adaptable in choice of nest site.

SAMPLE DENSITIES: 68 pairs per square mile (26 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 63 territorial males per 100 acres (40 ha) in shrubby field with stream-bordered trees in Maryland. 5 territorial males per 100 acres (40 ha) in field and edge habitat in Maryland (Stewart and Robbins 1958:282).

FORAGING: Major foods: Insects — caterpillars of gypsy moth and brown-tail and tent caterpillars, cankerworms, beetles, weevils, plant-lice, and grasshoppers. Also takes spiders. Substrates: Small tree limbs generally 4 to 40 feet (1.2 to 12.2 m) high (MacArthur 1958). Techniques: Branch hopping and gleaning, hawking.

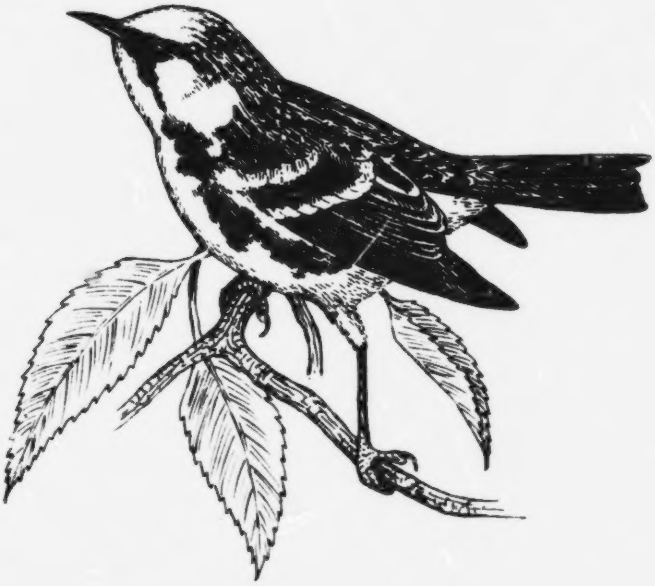
COMMENTS: Food composition is 94 percent animal, 6 percent vegetable (Forbes 1883 in Bent 1953:171).

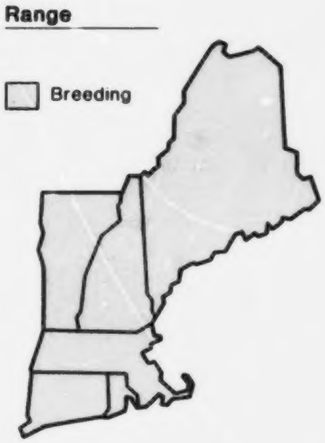
KEY REFERENCES: Bent 1953, Forbush 1929, Schrantz 1943.

Chestnut-sided Warbler

(Dendroica pensylvanica)

A.O.U. No. 659.0





RANGE: Breeding: Southern Canada s. through mountainous uplands to e. Tennessee and n. Georgia. Winter: Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Second growth woodland edges and abandoned fields; along brushy brooksides and hillsides, roadside thickets, woodland clearings and burns.

SPECIAL HABITAT REQUIREMENTS: Early second growth — sprouts and bush at wood margins, hardwood regeneration.

NESTING: Egg dates: May 20 to July 25, New York (Bull 1974:495). Clutch size: 4 to 5, typically 4. Incubation period: 12 to 13 days. Nestling period: 10 to 12 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 1 to 4 feet (0.3 to 1.2 m), typically 2 feet (0.6 m). Nest site: Well concealed in low bush, sapling, briars, or vines.

TERRITORY SIZE: Prior to mating, 4 territories measured 1.2, 1.3, 1.3, and 2.5 acres (0.5, 0.5, 0.5, 1.0 ha). During incubation, males increased territory size by 200 to 700 feet (61 to 213.4 m) to encompass 2 to 12 acres (0.8 to 4.9 ha) in New York (Kendeigh 1945b).

SAMPLE DENSITIES: 79 territorial males per 100 acres (40 ha) in dense second growth in Maryland. 67 territorial males per 100 acres (40 ha) in open slash (oak-maple) area (Stewart and Robbins 1958:294).

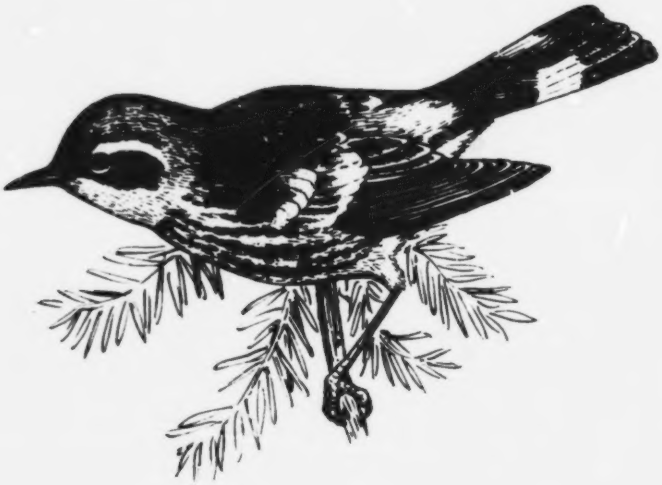
FORAGING: Major foods: Beetles, caterpillars, plant-lice, leaf hoppers, ants, spiders. Substrates: Foliage of shrubs or low plants to 35 feet (10.7 m) tall. Techniques: Hopping along branches and gleaning foliage.

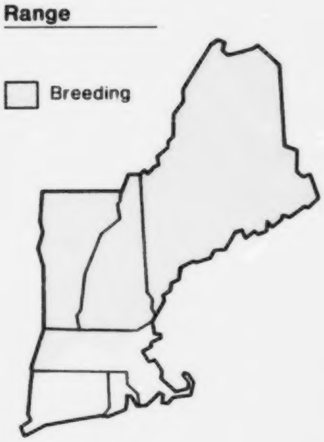
KEY REFERENCES: Griscom and Sprunt 1957, Kendeigh 1945b, Lawrence 1948.

Magnolia Warbler

(Dendroica magnolia)

A.O.U. No. 657.0





RANGE: Breeding: Newfoundland w. across Canada to c. Northwestern Territory, s. to c. British Columbia, Alberta, and e. to Wisconsin, s. Ontario and w. Massachusetts; southward in the mountains to sw. North Carolina. Winter: Mexico s. to Panama.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (mountains).

HABITAT: Breeding: Usually in small clumps of spruces or hemlocks, or in small coniferous saplings in old fields. Associated with woodland edges and clearings.

SPECIAL HABITAT REQUIREMENTS: Stands of young conifers.

NESTING: Egg dates: May 25 to July 11, New York (Bull 1974:482). Clutch size: 3 to 5, typically 4. Incubation period: 12 days. Nestling period: 10 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: 1 to 35 feet (0.3 to 10.7 m). Typically 1 to 10 feet (0.3 to 3.0 m). Nest site: Commonly in young conifers, rarely in hardwoods, on a horizontal branch.

TERRITORY SIZE: 20 males had territories which averaged 1.8 acres (0.7 ha) in size — habitat: hemlock, beech in New York (Kendeigh 1945). Differences in breeding territory size occurred in different forest types: aspen — (average) 1.8 acres (0.7 ha); conifer-birch — (average) 2.2 acres (0.9 ha); mixed — (average) 2.4 acres (1.0 ha); maple — (average) 3.3 acres (1.3 ha) (Stenger and Falls 1959).

SAMPLE DENSITIES: 22 pairs per 40 ha (100 acres) Loud's Island, Maine — forest is 83 percent red spruce, 14 percent white spruce; 15 pairs per 40 ha (100 acres) Marsh Island, Maine — 100 percent white spruce; 42 pairs per 40 ha (100 acres) Harbor Island, Maine — 100 percent white spruce (Morse 1976). 80 males per 100 acres (40 ha) in virgin hemlock forest in Maryland. 63 males per 100 acres (40 ha) in open hemlock-spruce bog in Maryland. 33 males per 100 acres (40 ha) in scrub spruce bog (Stewart and Robbins 1958:283).

FORAGING: Major foods: Weevils, leaf-beetles, leaf hoppers, plant lice, scale insects, ants, caterpillars, moths. Substrates: Branches of small trees or shrubs. Techniques: Twig and leaf gleaning.

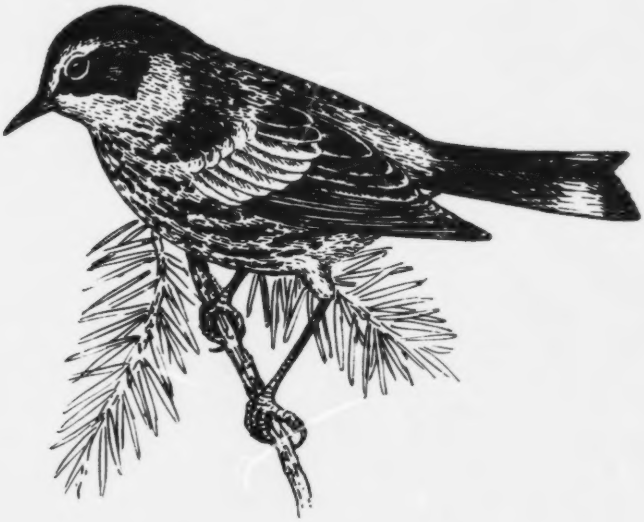
COMMENTS: Mostly insectivorous (King 1883 in Bent 1953:204). In New York, birds inhabit forests at higher elevations (Bull 1974:481).

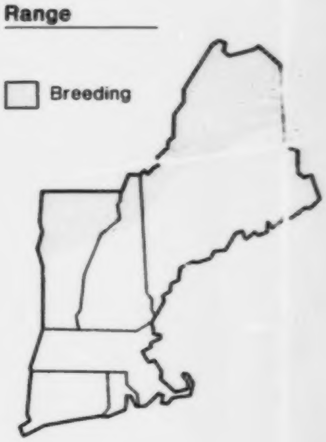
KEY REFERENCES: Bent 1953, Forbush 1929, Kendeigh 1945, Morse 1976, Stenger and Falls 1959.

Cape May Warbler

(Dendroica tigrina)

A.O.U. No. 650.0





RANGE: Breeding: Central and e. Canada, s. to n. Wisconsin, ne. New York, n. New Hampshire and n. Maine. Winter: West Indies n. to the Bahamas.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine).

HABITAT: Breeding: Fairly open coniferous forest with a high percentage of mature spruces; dense spruce forest with a scattering of taller spires above the canopy level; in more open land among small trees.

SPECIAL HABITAT REQUIREMENTS: Tall stands of spruce.

NESTING: Egg dates: June 10 to June 29. Peak: June 12 to June 20, New Brunswick (Bent 1953:224). Clutch size: 4 to 9, typically 6 or 7. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 2 to 60 feet (0.6 to 18.3 m). Typically 30 to 60 feet (9 to 18 m). Nest site: Usually in the top of a coniferous tree.

SAMPLE DENSITIES: 28 pairs per 100 acres (40 ha) spruce — fir forest near Lake Nipigon, Ontario (Kendeigh 1947 in Griscom and Sprunt 1957:118).

FORAGING: Major foods: Insects, ants, small adults and larvae of moths, flies, beetles, small crickets, termites, and larvae of dragonflies. Also takes spiders. Substrates: Tips of dense branches and new buds of firs and spruces near tops of trees. Techniques: Gleaning, hawking.

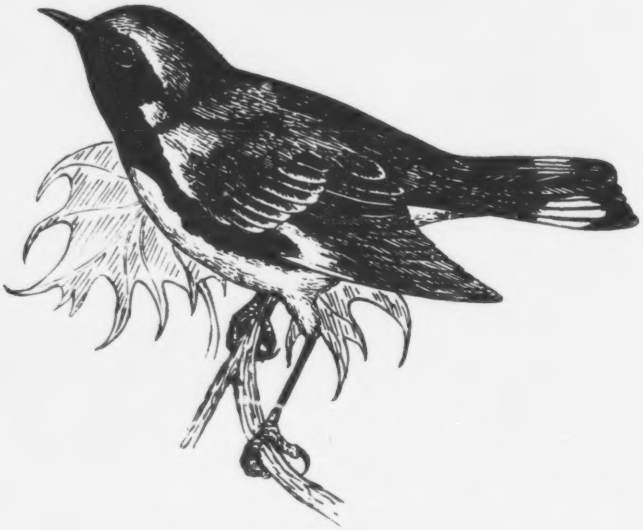
COMMENTS: Cape May Warblers are probably dependent on sporadic outbreaks of insects such as the spruce budworm that result in super-abundant food supplies (MacArthur 1958).

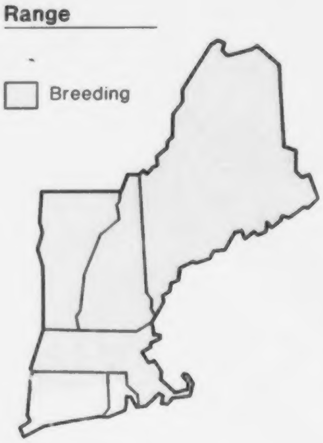
KEY REFERENCES: Forbush 1929, Griscom and Sprunt 1957, MacArthur 1958.

Black-throated Blue Warbler

(Dendroica caerulescens)

A.O.U. No. 654.0





RANGE: Breeding: Northern Minnesota, e. through Ontario, s. Quebec and Nova Scotia, s. to Connecticut and the mountains of Georgia. Winter: West Indies.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Commonly found in or near mixed and deciduous forests with heavy undergrowth or at edges of woodland clearings generally in moist places.

SPECIAL HABITAT REQUIREMENTS: Woodlands with thick, shrubby undergrowth (Pough 1949:164).

NESTING: Egg dates: May 29 to July 16, New York (Bull 1974:484). Clutch size: 4 to 5. Incubation period: 12 days. Nestling period: 10 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 4 inches (10 cm) to 20 feet (6.1 m), New York (Bull 1974:484). Nest site: In coniferous or deciduous trees, or in shrubs.

SAMPLE DENSITIES: Maryland — 58 territorial males per 100 acres (40 ha) in virgin hemlock forest. 48 territorial males per 100 acres (40 ha) in young second growth. 17 territorial males per 100 acres (40 ha) in scrub spruce bog (Stewart and Robbins 1958:286).

FORAGING: Major foods: Insects — mainly hairy caterpillars, moths, crane-flies, mosquitoes, plant-lice. Substrates: Upper branches. Techniques: Hawking, branch and twig gleaning.

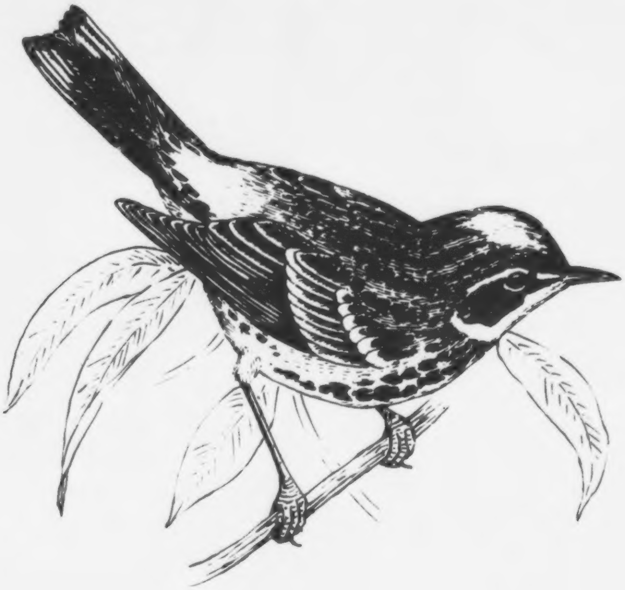
COMMENTS: Considered a deep woods Warbler, but also common in clearcuts after 15 years.

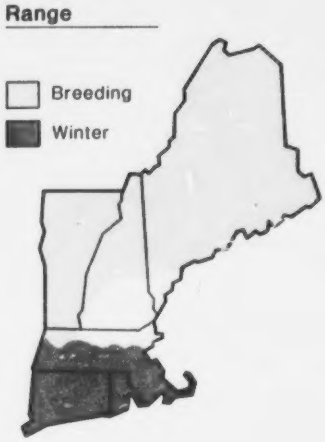
KEY REFERENCES: Bent 1953, Griscom and Sprunt 1957, Nice 1930.

Yellow-rumped Warbler

(Dendroica coronata)

A.O.U. No. 655.0





RANGE: Breeding: Alaska and Canada s. to Massachusetts (Berkshires), Pennsylvania (Poconos), and New York (Catskills). Winter: Central New England, s. through the United States, Central America, Bermuda, Bahamas, and the Virgin Islands.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common breeder at higher elevations.

HABITAT: Breeding: Coniferous woods (especially in spruce-fir) or in young coniferous growth near the edges of woods; sometimes in mixed woods. Wintering: Along the coast in any type of woodland, in thickets, gardens.

SPECIAL HABITAT REQUIREMENTS: Coniferous trees (summer), bayberry thickets (winter).

NESTING: Egg dates: May 19 to July 10, New York (Bull 1974:486). Clutch size: 3 to 5, typically 4. Incubation period: 12 to 13 days. Nestling period: 12 to 14 days. Broods per year: 1 or 2. Age at sexual maturity 1 year. Nest height: 4 to 50 feet (1.2 to 15.2 m). Typically 15 to 20 feet (4.6 to 6.1 m). Nest site: Usually in a small coniferous tree, typically saddled on a branch of spruce, hemlock, or cedar. Sometimes in a deciduous tree such as maple or birch.

SAMPLE DENSITIES: 30 pairs per 40 ha (100 acres) Loud's Island, Maine, 83 percent red spruce and 14 percent white spruce (Morse 1976). 39 pairs per 40 ha (100 acres) Marsh Island, Maine, 100 percent white spruce (Morse 1976). 31 pairs per 40 ha (100 acres) Harbor Island, Maine, 100 percent white spruce (Morse 1976).

FORAGING: Major foods: Insects in summer—plant lice, caterpillars, small grubs, ants, and leaf beetles. In winter—eggs and larvae of some insects, bayberries, berries of red cedar, woodbine, viburnums, honeysuckle, mountain ash, poison ivy, and so on. Substrates: Trunks and branches from tops of trees to ground level, air. Techniques: Trunk and branch gleaning and hawking.

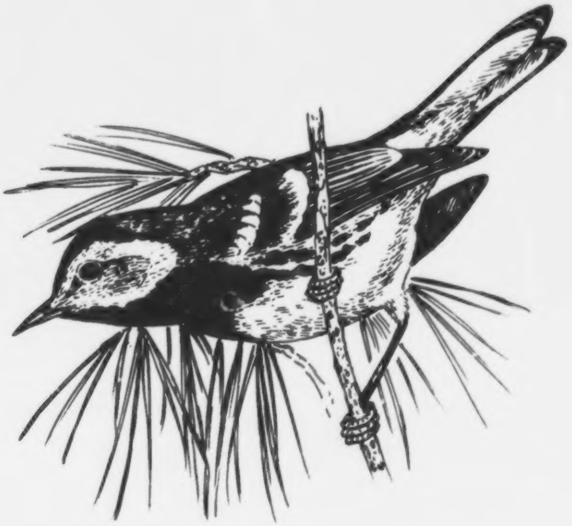
COMMENTS: Also uses evergreen plantations (New York) (Bull 1974:486).

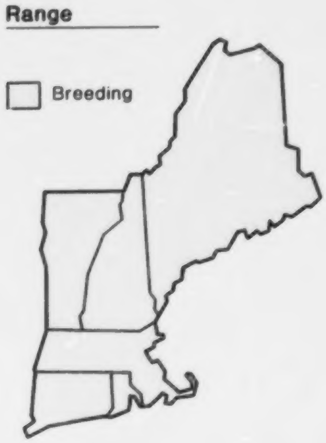
KEY REFERENCES: Bent 1953, Forbush 1929, MacArthur 1958, Morse 1976.

Black-throated Green Warbler

(Dendroica virens)

A.O.U. No. 667.0





RANGE: Breeding: Central Canada to c. New Jersey and s. in the mountains to Alabama and Georgia. Winter: Southern Texas and sc. Florida, s. to Greater Antilles, e. Mexico to Panama.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Usually in hemlocks, but sometimes in other northern conifers: pine, spruce, fir, and cedar. Rarely in maples, birches, and other hardwoods.

SPECIAL HABITAT REQUIREMENTS: Coniferous or mixed woodlands.

NESTING: Egg dates: May 24 to July 2, New York (Bull 1974:489). Clutch size: 4 to 5, typically 4. Incubation period: 12 days. Nestling period: 8 to 10 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 1 to 70 feet (0.3 to 21.3 m). Typically 15 to 20 feet (4.6 to 6.1 m). Nest site: Usually on a horizontal or drooping branch.

TERRITORY SIZE: 21 territories ranged from 0.6 to 2.5 acres (0.2 to 1.0 ha); average size 1.6 acres (0.6 ha) (New York) (Kendeigh 1945); habitat: hemlock-beech.

SAMPLE DENSITIES: 71 pairs per 40 ha (100 acres) Loud's Island, Maine; 83 percent red spruce, 14 percent white spruce (Morse 1976). 61 pairs per 40 ha (100 acres) Marsh Island, Maine 100 percent white spruce (Morse 1976). 83 pairs per 40 ha (100 acres) Harbor Island, Maine, 100 percent white spruce (Morse 1976). 36 territorial males per 100 acres (40 ha) in mature oak-maple forest in Maryland. 9 territorial males per 100 acres (40 ha) in mature northern hardwood forest (Stewart and Robbins 1958:288).

FORAGING: Major foods: Insects—leaf rollers, leaf-eating caterpillars, beetles, flies, gnats, and plant lice. Also takes mites, cankerworms, spiders, some berries. Substrates: Often limbs and foliage of evergreens 10 to 50 feet (3.0 to 15.2 m) above ground. Techniques: Hopping, rapid peering or hovering followed by gleaning, occasional hawking.

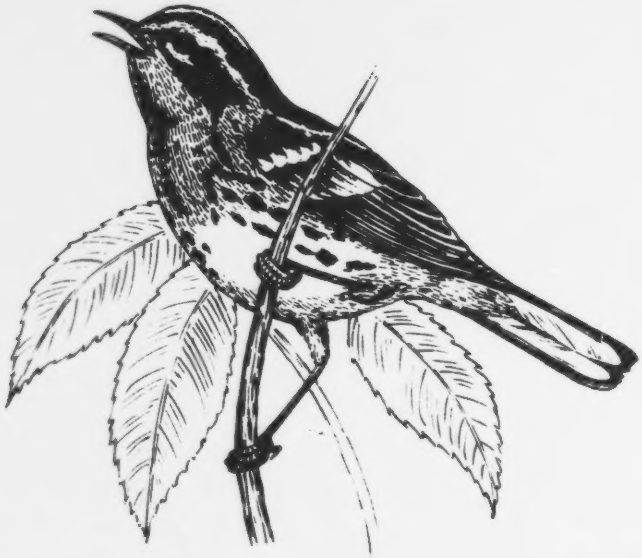
COMMENTS: Strongly associated with hemlocks.

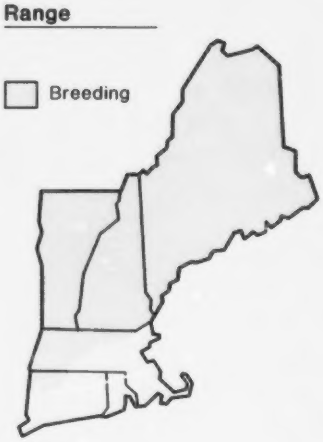
KEY REFERENCES: Forbush 1929, Kendeigh 1945, MacArthur 1958, Morse 1976.

Blackburnian Warbler

(Dendroica fusca)

A.O.U. No. 662.0





RANGE: Breeding: Southern Canada to nw. Connecticut, se. New York and n. New Jersey s. to the mountains of South Carolina. Winter: Southern Central America, n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common, especially in higher elevations.

HABITAT: Breeding: Deep coniferous woods or swampy woods where spruces are thickly draped with bearded lichen (*Usnea*); often associated with very tall hemlocks; also said to inhabit stands of second growth deciduous woods.

SPECIAL HABITAT REQUIREMENTS: Coniferous woodlands.

NESTING: Egg dates: June 1 to June 24, New York (Bull 1974:492). Clutch size: 4 to 5, typically 4. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 5 to 84 feet (1.5 to 25.6 m). Typically 30 to 50 feet (9.1 to 15.2 m). Nest site: High up in a tree (usually a spruce) situated well away from the trunk or in small fork near top of tree.

TERRITORY SIZE: 9 territories averaged 1.3 acres (0.5 ha) in size per pair in New York; habitat: hemlock-beech (Kendeigh 1945).

SAMPLE DENSITIES: 26 pairs per 40 ha (100 acres) Loud's Island, Maine, 83 percent red spruce, 14 percent white spruce (Morse 1976). 17 pairs per 40 ha (100 acres) Marsh Island Maine, 100 percent white spruce (Morse 1976). 100 territorial males per 100 acres (40 ha) in virgin hemlock forest in Maryland. 96 territorial males per 100 acres (40 ha) in virgin spruce-hemlock bog forest in Maryland. 39 territorial males per 100 acres (40 ha) in scrub spruce bog in Maryland (Stewart and Robbins 1958:291).

FORAGING: Major foods: Almost entirely insects such as beetles, caterpillars, ants, crane-files. Substrates: High tree limbs. Techniques: Passing from limb to limb with rapid gleaning, occasionally hovering or hawking.

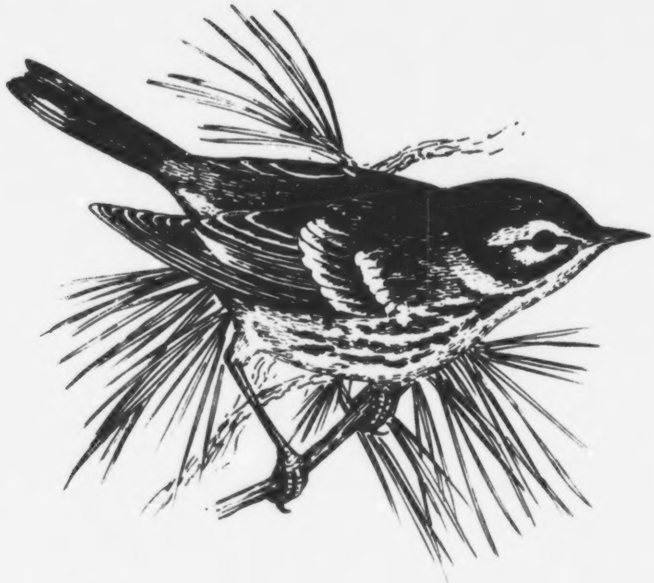
COMMENTS: Considered a deep-woods warbler; lives in the the tops of northern conifers, especially spruces.

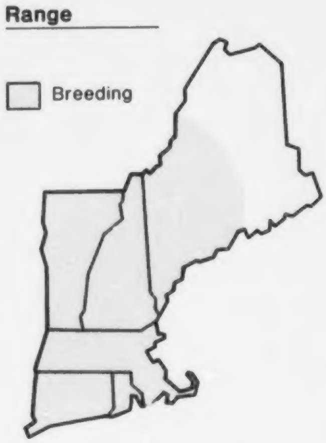
KEY REFERENCES: Bent 1953, Griscom and Sprunt 1957, Kendeigh 1945, MacArthur 1958, Morse 1976.

Pine Warbler

(Dendroica pinus)

A.O.U. No. 671.0





RANGE: Breeding: Southern edge of Canada to the Gulf States. Winter: In the s. third of breeding range; some strays may be found as far n. as Massachusetts.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to rare.

HABITAT: Breeding: Exclusively in pines, favoring open pitch pine woods with tall trees. Frequents coastal pine barrens, less common inland. Wintering: Mature loblolly pine stands, especially those near tidewater.

SPECIAL HABITAT REQUIREMENTS: Pines. Pitch pine is preferred but other species of pine are used as well.

NESTING: Egg dates: May 4 to June 6, New York (Bull 1974:502). Clutch size: 3 to 5, typically 4. Incubation period: Probably 12 to 13 days (period unknown). Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 8 to 800 feet (2.4 to 24.4 m). Typically 30 to 50 feet (9.1 to 15.2 m). Nest site: saddled on a horizontal branch well out from the trunk; sometimes situated among the small twigs towards the end of a limb, obscured from below by a cluster of pine needles.

SAMPLE DENSITIES: Maryland—76 territorial males per 100 acres (40 ha) in immature loblolly-shortleaf pine stand. 20 territorial males per 100 acres (40 ha) in pine-oak forest. 10 territorial males per 100 acres (40 ha) in mature scrub pine (Stewart and Robbins 1958:297).

FORAGING: Major foods: Insects—adult and larvae of beetles, ants, grasshoppers, moths, bugs, flies, and scale insects. Also takes spiders and small amounts of pine and pirch seeds, berries of wax myrtle. Substrates: Trunks and larger branches of pines. Techniques: Trunk and branch gleaning.

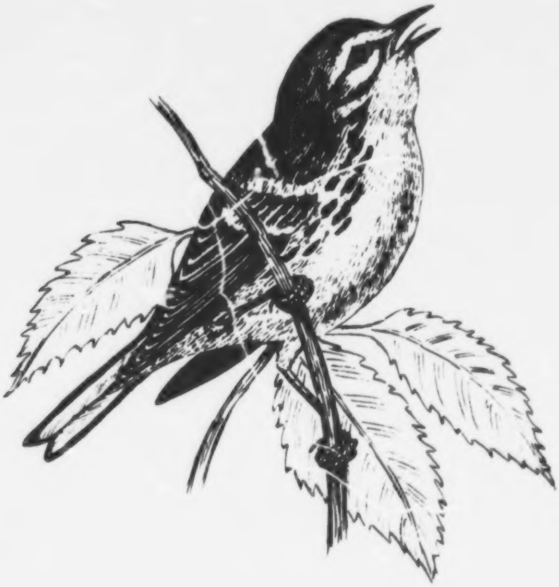
COMMENTS: Generally associated with pines, especially pitch, loblolly and Virginia where they occur within its breeding range in the Northeast. Distribution is spotty.

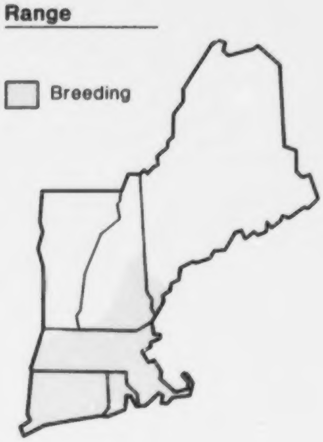
KEY REFERENCES: Bent 1953, Forbush 1929.

Prairie Warbler

(Dendroica discolor)

A.O.U. No. 673.0





RANGE: Breeding: Northern Michigan, s. Ontario, c. New York and c. New England, s. Winter: Throughout the West Indies.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Breeding: Open sandy or gravelly areas with scattered pitch pines, scrub oaks and other plants with similar requirements; prefers barren lands, dry, rocky or brushy pasture, and dry sproutland often with scattered redcedars. Young stands of pine 10 to 30 feet (3 to 9 m) tall (Robbins et al. 1966:268) and deciduous saplings. Logging and burning create favorable habitat.

SPECIAL HABITAT REQUIREMENTS: Favors coniferous cover. Avoids high elevations.

NESTING: Egg dates: May 25 to June 29, New York (Bull 1974:505). Clutch size: 3 to 5, typically 4. Incubation period: 10 to 14, typically about 12 days (Nolan 1978:235). Nestling period: 8 to 11 days, typically 9 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: Less than 1 foot (0.3 m) to 45 feet (13.7 m). Typically 3.3 to 6.6 feet (1.0 to 2.0 m) (Nolan 1978:127). Nest site: usually well hidden in upright fork of sapling or shrub. Less frequently in vines. American elm, sugar maple, hawthorn, scrub oak, and bayberry are important nest plants (Nolan 1978:133, Bent 1953:431).

TERRITORY SIZE: Maximum territories ranged in size from 0.4 to 3.5 ha (1 to 9 acres). Average 1.6 ha (0.6 acres) in Indiana (Nolan 1978:332).

FORAGING: Major foods: Larvae and adults of beetles, bugs, butterflies and moths, wasps, bees, flies, and grasshoppers. Also takes spiders. Substrates: Trees, saplings, shrubs, herbaceous vegetation, bare ground, air. Techniques: Branch, twig and leaf gleaning; flycatching; hovering; clinging to vertical stems; dropping to ground.

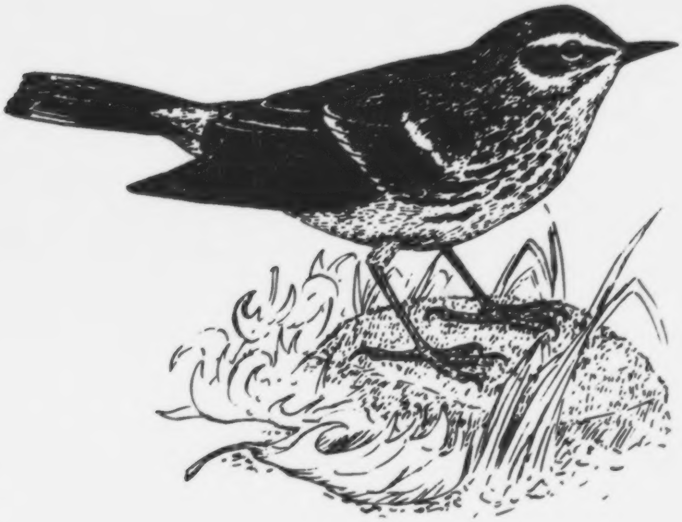
COMMENTS: Breeding range is expanding northward—influenced to a great extent by availability of Christmas tree plantations (Harrison 1975:196).

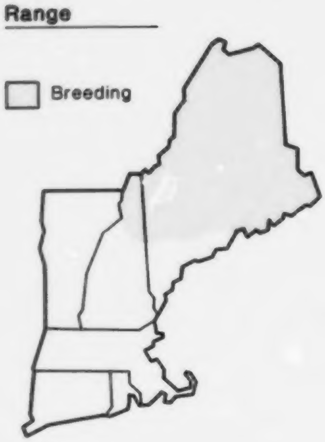
KEY REFERENCES: Bent 1953, Forbush 1929, Nolan 1978.

Palm Warbler

(Dendroica palmarum)

A.O.U. No. 672.0





RANGE: Breeding: Southeastern Canada to c. Maine and c. New Hampshire. Winter: Southeastern United States casually n. along coast to New Jersey and Connecticut.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon in breeding season. Rare in winter.

HABITAT: Breeding: Frequents sphagnum bogs and wet muskegs, open barrens, and dry spruce forests.

NESTING: Egg dates: May 18 to June 8, Nova Scotia (Bent 1953:449). Clutch size: 4 to 5. Incubation period: 12 days. Nestling period: 12 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest site: A dry spot on ground such as a hummock where nest is concealed by grasses or other nearby vegetation; rarely on low branches of small spruce trees. Nests singly or in loose colonies.

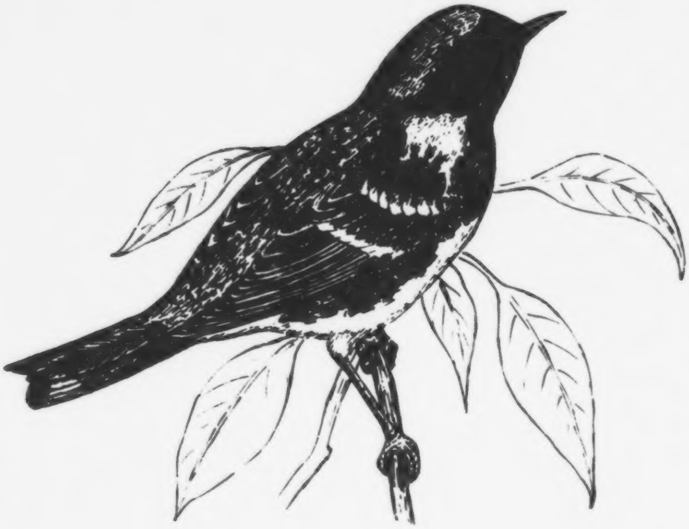
FORAGING: Major foods: Mainly insects such as beetles, ants, caterpillars, grasshoppers, gnats, mosquitoes, flies, and mayflies. Vegetable matter, especially barberries during the winter months. Substrates: On the ground, in the air. Technique; Hawking.

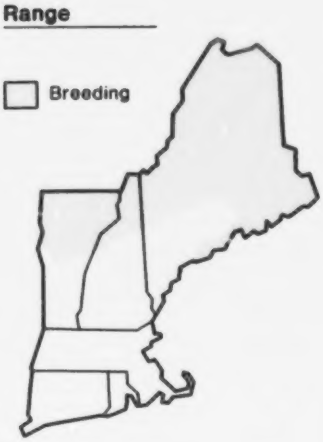
KEY REFERENCES: Bent 1953, Forbush 1929, Walkinshaw and Wolf 1957.

Bay-breasted Warbler

(Dendroica castanea)

A.O.U. No. 660.0





RANGE: Breeding: Central Canada to ne. New York, c. Vermont and New Hampshire and s. Maine. Winter: Central and e. Panama to n. Colombia and w. Venezuela.

RELATIVE ABUNDANCE IN NEW ENGLAND: Fairly common to rare.

HABITAT: Breeding: Northern coniferous or mixed forests, especially in young trees along ponds, streams, in bogs or forest clearings.

SPECIAL HABITAT REQUIREMENTS: Early coniferous second growth of trees 6 to 10 feet (1.8 to 3.4 m) tall (Pough 1949:174).

NESTING: Egg dates: June 5 to July 2, peak: June 17 to June 25, New Brunswick (Bent 1953:389). Clutch size: 4 to 7, typically 5 or 6. Incubation period: 12 to 13 days. Nestling period: 11 to 12 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 4 to 40 feet (1.2 to 12.2 m). Typically 15 to 25 feet (4.6 to 7.6 m). Nest site: Along a horizontal branch of a conifer or in the top of a small tree, usually 5 to 10 feet (1.5 to 3.0 m) out from trunk.

FORAGING: Major foods: Locusts, caterpillars, ants, beetles, leafhoppers, houseflies, spiders. Substrates: Foliage of trees at all heights but mainly in interior of tree tops. Techniques: Searching and foliage gleaning with slow deliberate movements, often spending much time in same tree (MacArthur 1958). Occasionally hangs upside-down. Rarely hovers.

COMMENTS: Bay-breasted warblers may depend on periodic outbreaks of abundant insects such as the spruce budworm (MacArthur 1958).

KEY REFERENCES: Chapman 1907, Forbush 1929, Griscom and Sprunt 1957, Mendall 1937.

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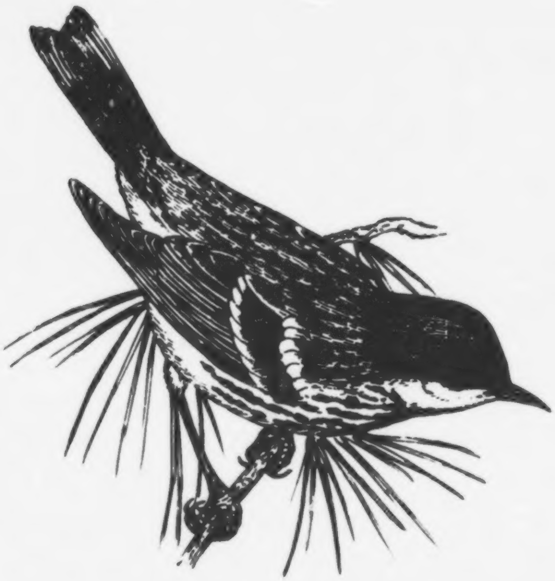
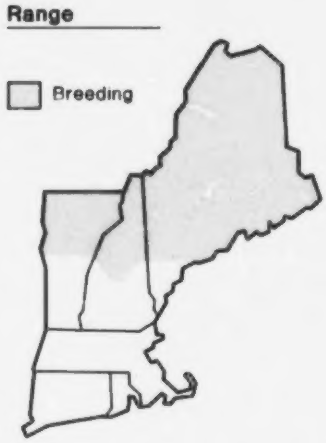
Blackpoll Warbler

(Dendroica striata)

A.O.U. No. 661.0





RANGE: Breeding: Edge of timber from nw. and s. Alaska across to Newfoundland, s. to s. Nova Scotia, and islands off e. Maine; New England mountains. Winter: Northern South America to e. Brazil.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common, local on Mt. Greylock (Massachusetts) (Bull 1974:497).

HABITAT: Breeding: Among low coniferous trees at high elevations, often in swampy groves, in stunted spruce and fir on the upper slopes of mountains. Favors small growth (stunted, young or medium-sized conifers).

SPECIAL HABITAT REQUIREMENTS: Low coniferous growth.

NESTING: Egg dates: June 5 to July 10, New York (Bull 1974:499). Clutch size: 3 to 5, typically 4 or 5. Incubation period: 11 to 12 days. Nestling period: 10 to 12 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 1 to 12 feet (0.3 to 3.7 m). Typically 5 feet (1.5 m). Nest site: Usually low in a spruce or other conifer; rarely on the ground.

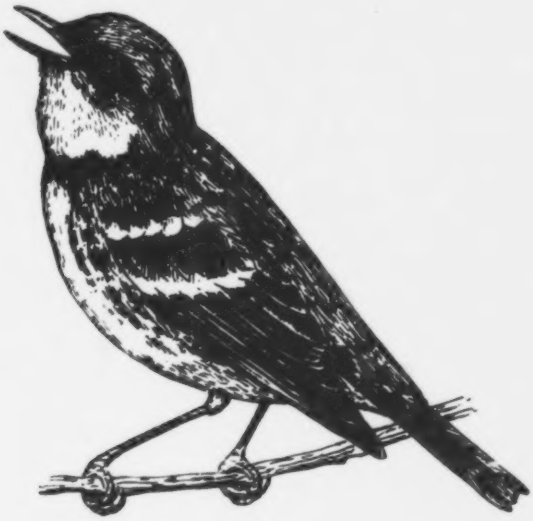
FORAGING: Major foods: Insects such as spruce-gall lice, cankerworms, mosquitoes, fall webworms, locusts, ants, gnats; some seeds and berries. Substrates: Leaves and twigs. Techniques: Foliage gleaning.

KEY REFERENCES: Bent 1953, Forbush 1929.

Cerulean Warbler

(Dendroica cerulea)

A.O.U. No. 658.0



Range
☐ Breeding

RANGE: Breeding: In the East from se. Ontario and c. New York, s. Also found in Sandbar State Park, Vermont. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common at low elevations in the Champlain Valley.

HABITAT: Breeding: Swamps and bottomlands. Favors open stands of tall trees along riverbanks or dense deciduous forests with little undergrowth. Generally occupies upper canopy.

SPECIAL HABITAT REQUIREMENTS: Tall deciduous trees.

NESTING: Egg dates: May 19 to June 23, New York (Bull 1974:490). Clutch size: 3 to 5, typically 4. Incubation period: 12 to 13. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 20 to 60 feet (6.1 to 18.3m). Nest site: Usually in the fork of a tall tree, some distance from the trunk with an open area below. Elm was a favorite nest tree in New York State (Bull 1974:490).

SAMPLE DENSITIES: 4.8 territorial males per 20 ha (50 acres) in birch-basswood habitat in Pennsylvania (Van Velzen 1977).

FORAGING: Major foods: Mainly insects such as wasps, ants, bees, beetles, weevils, and caterpillars. Substrates: Air, leaves. Techniques: Hawking, foliage gleaning.

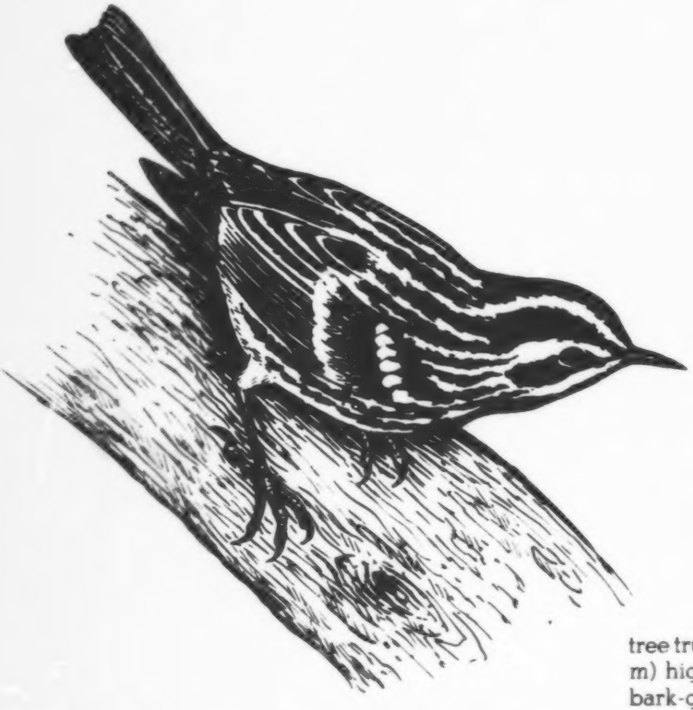
COMMENTS: Eats chiefly insects (Griscom 1957:151).

KEY REFERENCES: Bent 1953, Forbush 1929, Griscom and Sprunt 1957, Linehan 1973.

Black-and-white Warbler

(Mniotilta varia)

A.O.U. No. 636.0



Range
Breeding

RANGE: Breeding: Southern Canada, s. to n. Mississippi, c. Alabama, c. Georgia, s. South Carolina, and se. North Carolina. Winter: From Baja, California, s. Texas, c. Florida, and the Bahamas, s. through Central America and the West Indies to n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Mature or second-growth deciduous or mixed woodlands from near sea level to mountain peaks. Not abundant in northern coniferous forests.

NESTING: Egg dates: May 10 to June 30, New York (Bull 1974:463). Clutch size: 4 to 5, typically 5. Incubation period: 13 days. Nesting period: 11 to 12 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: A depression in the ground at the base of a tree, stump or over-turned roots, rock or in the shelter of a log, usually hidden from above.

SAMPLE DENSITIES: Maryland—21 territorial males per 100 acres (40 ha) in dense second growth. 13 territorial males per 100 acres (40 ha) in open slash area. 11 territorial males per 100 acres (40 ha) in virgin hardwood forest (Stewart and Robbins 1958:270).

FORAGING: Major foods: Wood boring insects, click beetles, plant lice, small caterpillars, moths, spiders, egg masses, and pupae. Substrates: Bark crevices of tree trunks and main branches, generally to 35 feet (10.7 m) high (MacArthur 1958). Techniques: creeping and bark-gleaning.

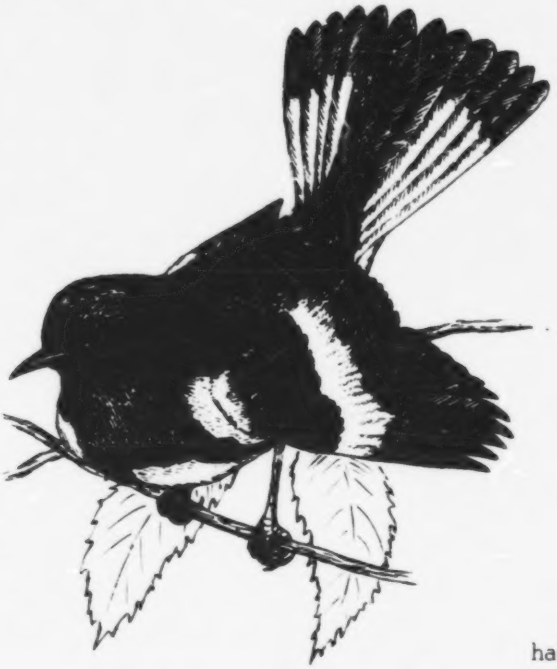
COMMENTS: One of the earliest warblers to arrive on northern breeding grounds in spring.

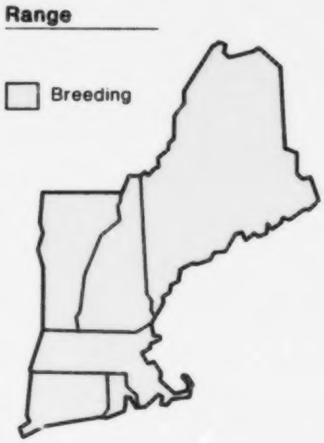
KEY REFERENCES: Forbush 1929, Griscom and Sprunt 1957, Harrison 1975.

American Redstart

(Setophaga ruticilla)

A.O.U. No. 687.0





RANGE: Breeding: From limit of tree growth, s. to Oregon, Arkansas, North Carolina, and the mountains of Georgia. Winter: Mexico and the West Indies to Ecuador and British Guiana.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: In orchards, saplings bordering on pastures, second-growth deciduous woodlands (occasionally coniferous or mixed); in shade trees and shrubbery about dwellings, second-growth maples; also in willow and alder thickets bordering ponds and streams. Most abundant in extensive, sapling/pole stage deciduous woodlands (Bond 1957).

NESTING: Egg dates: May 22 to July 16, New York (Bull 1974:522). Clutch size: 3 to 5, typically 4. Incubation period: 12 to 14 days. Nestling period: 8 to 9 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 4 to 30 feet (1.2 to 9.1 m). Nest site: In upright crotch of a tree or on a horizontal limb, sapling, or shrub.

TERRITORY SIZE: Slightly less than 1 acre (0.4 ha) per pair (Griscom and Sprunt 1957:241); 1 acre (0.4 ha) or less per pair (Hickey, in Bent 1953); 0.8 acres (0.3 ha) per male (Ficken 1962); 6 territories on 1.4 acres (0.6 ha) (average 0.24 acres, 0.1 ha); 9 territories on 1.4 acres (0.6 ha) (average 0.16 acres, 0.1 ha) in orchard, second-growth woodland comprised of sugar maple, basswood, hackberry, black cherry, and elm with younger trees and sumac as understory along western Lake Erie (Sturm 1945).

SAMPLE DENSITIES: 7 males were sighted 10 to 20 m (33 to 66 feet) apart in area 100 m^2 (120 square yard) (Baker 1944) in a thick stand of young sugar maples (saplings) with a scattering of large deciduous trees. 36 pairs per 40 ha (100 acres) Harbor Island, Maine, in white spruce (Morse 1976). 51 territorial males per 100 acres (40 ha) in well-drained floodplain forest in Maryland, and 91 territorial males per 100 acres (40 ha) in second-growth river swamp (Stewart and Robbins 1958:316).

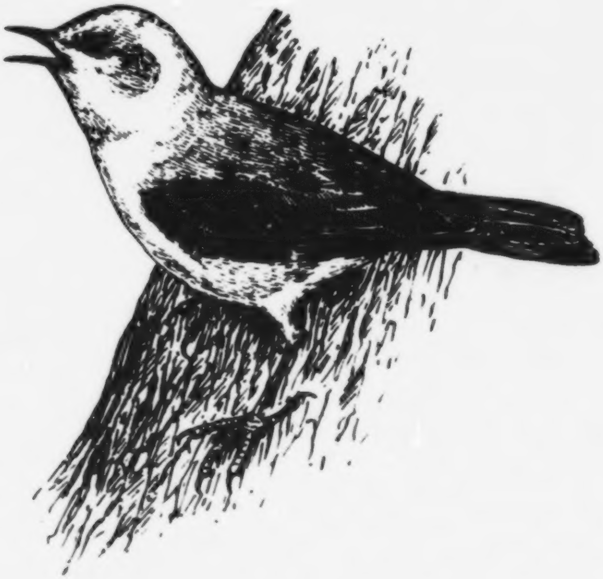
FORAGING: Major foods: Insects such as caterpillars, bugs, flies, moths, small grasshoppers, beetles, and wasps. Also takes spiders and small amounts of fruit. Substrates: Dead tree limbs, foliage, air. Generally feeds at heights between 5 and 50 feet (1.5 and 15.2 m) (MacArthur 1958). Techniques: Branch and twig gleaning hawking.

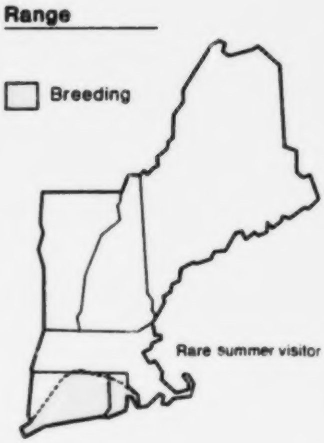
KEY REFERENCES: Bent 1953, Forbush 1929, Griscom and Sprunt 1957.

Prothonotary Warbler

(Protonotaria citrea)

A.O.U. No. 637.0





RANGE: Breeding: Southeastern Minnesota and ne. Nebraska e. to s. Ontario, c. New York and c. New Jersey s. to Florida. Winter: Nicaragua to Colombia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Wooded swamps, borders of streams and shallow ponds and flooded bottomlands often heavily shaded with oak, maple, ash, and elm.

SPECIAL HABITAT REQUIREMENTS: Cavity for nesting; border between water and thick deciduous woods (Simpson 1969).

NESTING: Egg dates: May 17 to June 29, New York (Bull 1974:464). Clutch size: 3 to 8, typically 6. Incubation period: 12 to 14 days. Nesting period: 10 or 11 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 3 to 32 feet (1.0 to 9.8 m). Typically 5 to 10 feet (1.5 to 3.0 m). Nest site: Natural cavities, abandoned woodpecker holes or nest boxes. Almost always in well-shaded stumps or snags that are standing in water or less than 20 feet (6 m) from it (Simpson 1969). Male builds one or two dummy nests.

TERRITORY SIZE: Linear—240 to 300 m (792 to 990 feet) of woody vegetation at water's edge (Simpson 1969). An area 168 (552 feet) long by 61.0 m (201 feet) wide was occupied by one male (Tennessee) (Meyer and Nevius 1943). Habitats: grassy terraces (with several nesting boxes); river banks densely covered with small trees and bushes.

SAMPLE DENSITIES: 40 territorial males per 100 acres (40 ha) in second-growth river swamp in Maryland (Stewart and Robbins 1958:272). Maximum 27 pairs per 40 ha (100 acres) (Hardin and Evans 1977).

FORAGING: Major foods: Caterpillars, ants, flies, bees, locusts, aquatic insects, beetles, spiders, small snails. Substrates: Trunks and branches of trees. Techniques: Trunk and branch gleaning.

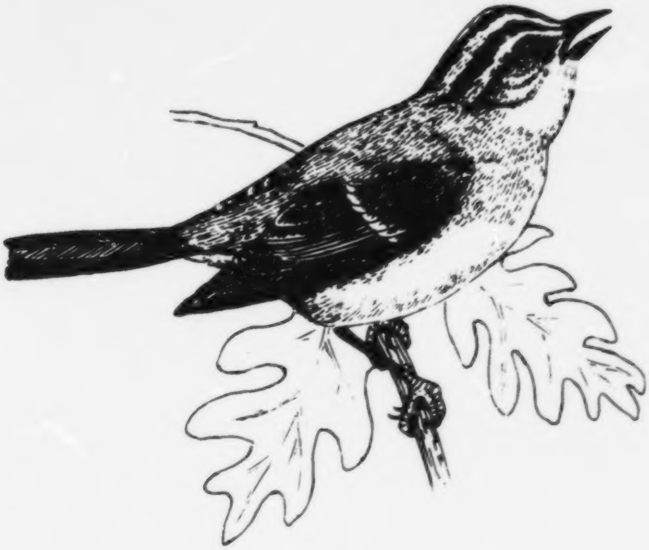
COMMENTS: Highly insectivorous (Bent 1953:25).

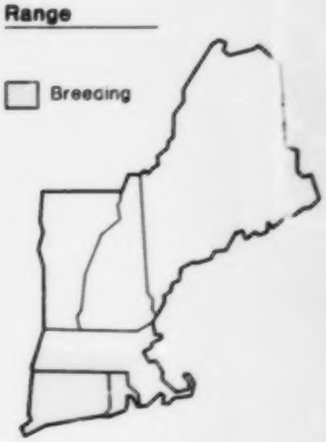
KEY REFERENCES: Griscom and Sprunt 1957; Simpson 1969, Walkinshaw 1938b, 1953.

Worm-eating Warbler

(Helmitheros vermivorus)

A.O.U. No. 639.0





RANGE: Breeding: From s. New England, w. New York, n. Indiana, and s. Iowa, s. to Virginia, n. Georgia, and s. Missouri. Winter: The Bahamas, the West Indies, and Central America. Rarely n. to Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common (Lower Hudson Valley) to rare (north shore of Long Island) (Bull 1974:466).

HABITAT: Breeding: Deep, damp woods, wooded ravines or hillsides often near a running stream and a dense understory. Birds favor second-growth deciduous woods with young trees and a shrubby understory (Pough 1949:149).

SPECIAL HABITAT REQUIREMENTS: Dense undergrowth.

NESTING: Egg dates: May 24 to June 18, New York (Bull 1974:466). Clutch size: 3 to 6, typically 4 to 5. Incubation period: 13 days. Nestling period: 10 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: On ground often at base of tree, rock, or log. On hillsides or banks of ravines.

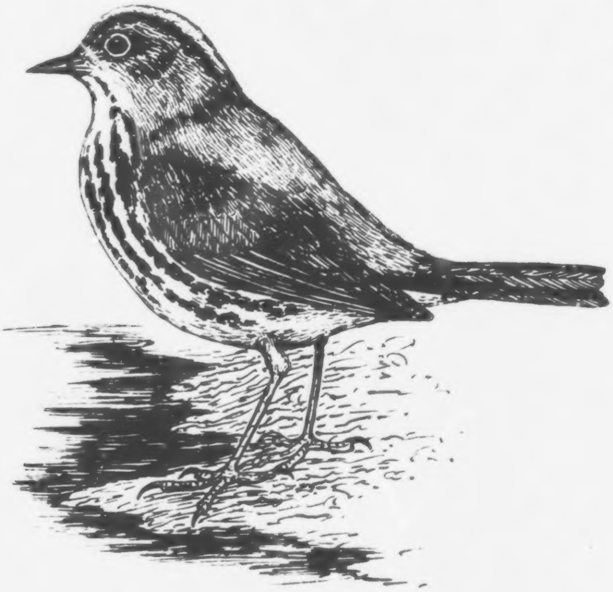
FORAGING: Major foods: Mainly insects, takes few worms. Substrates: Leaf litter of forest floor. Techniques: Ground gleaning.

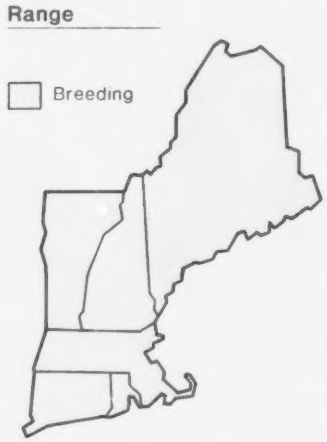
KEY REFERENCES: Bent 1953, Forbush 1929.

Ovenbird

(Seiurus aurocapillus)

A.O.U. No. 674.0





RANGE: Breeding: Central Canada and the ne. United States, s. in the mountains to Georgia. Winter: Florida w. to Mexico, s. to Central America, the West Indies and n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Usually in closed-canopy, mature deciduous or mixed woods, but often among pines; open forests with little underbrush and an abundance of fallen leaves, logs, and rocks are preferred. Thinning may reduce ovenbird abundance until the canopy closes (Johnston 1970).

NESTING: Egg dates: May 17 to July 22, New York (Bull 1974:507). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 12 days. Nestling period: 8 to 10 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: On ground (sloped or level), in depression of dead leaves, sometimes at base of tree or log, invariably roofed over and concealed from above by vegetation.

TERRITORY SIZE: 0.5 to 4.5 acres (0.2 to 1.8 ha) per pair (Hann 1937); 21 territories averaged 1.6 acres (0.6 ha), range 0.25 to nearly 3 acres (0.1 to 1.2 ha) — habitat: hemlock-beech (Kendeigh 1945).

SAMPLE DENSITIES: Maryland — 40 territorial males per 100 acres (40 ha) in mixed oak forest. 26 territorial males per 100 acres (40 ha) in dense second growth. 24 territorial males per 100 acres (40 ha) in young second growth (resulting from cutting). 17 territorial males per 100 acres (40 ha) in pine-oak forest (Stewart and Robbins 1958:302).

FORAGING: Major foods: Insects such as plant lice, caterpillars (hairy and hairless), other larvae, moths, butterflies, grasshoppers, and crickets. Also consumes small snails, slugs, myriapods, earthworms, and spiders. Substrates: Leaf litter and debris of forest floor. Technique: Ground gleaning.

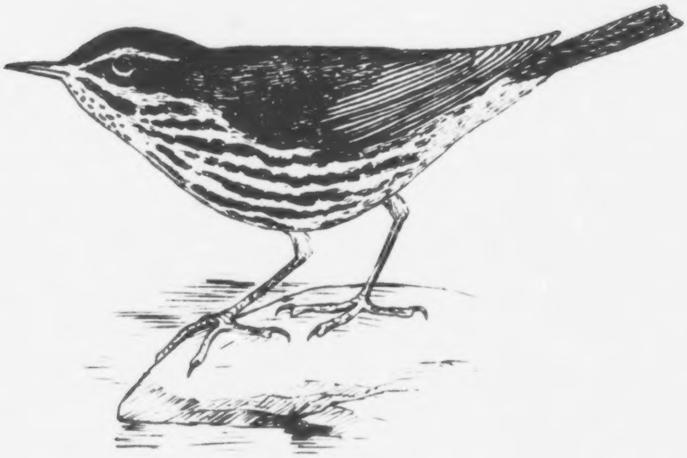
COMMENTS: Pairs may mate in successive years (Bent 1953:458).

KEY REFERENCES: Bent 1953, Forbush 1929, Hann 1937.

Northern Waterthrush

(Seiurus noveboracensis)

A.O.U. No. 675.0



Range
☐ Breeding

RANGE: Breeding: Southern Quebec, Labrador, and Newfoundland, s. to se. New York, West Virginia, and Pennsylvania (in Appalachians), s. New England. Winter: Mainly from Mexico and the West Indies s. to n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to common (widespread).

HABITAT: Breeding: Favors wooded swamps and bogs, less frequently occurs along woodland brooks or streams and swampy wooded shores of ponds or lakes. Commonly breeds at moderately high elevations.

SPECIAL HABITAT REQUIREMENTS: Cool, shady, wet ground with open pools of shallow water (Pough 1949:181).

NESTING: Egg dates: May 10 to June 28, New York (Bull 1974:509). Clutch size: 4 to 5. Incubation period: 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: In cavity on the ground: among roots of fallen trees, at base of moss-covered stump, under mossy log, or in side of mossy brook bank.

SAMPLE DENSITIES: Maryland — 84 territorial males per 100 acres (40 ha) in open hemlock-spruce bog. 33 territorial males per 100 acres (40 ha) in scrub spruce bog (Stewart and Robbins 1958:303).

FORAGING: Major foods: Aquatic insects, beetle larvae, moths, mosquitoes, ants. Also takes small crustaceans, mollusks, and worms. Substrates: Crevices in rocks. Technique: Ground gleaning.

KEY REFERENCES: Forbush 1929, Griscom and Sprunt 1957.

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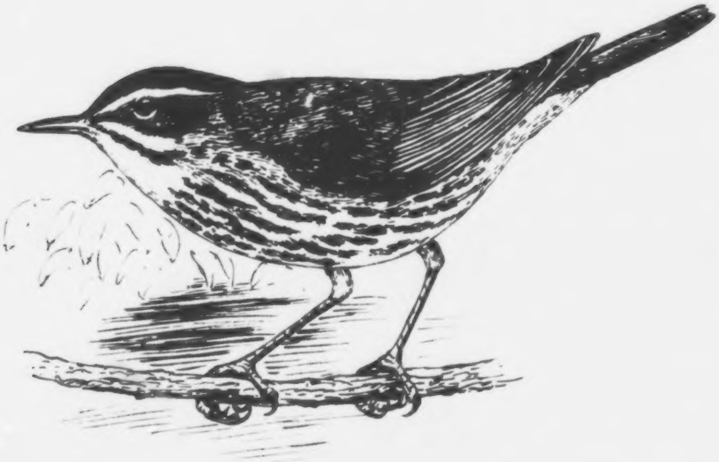
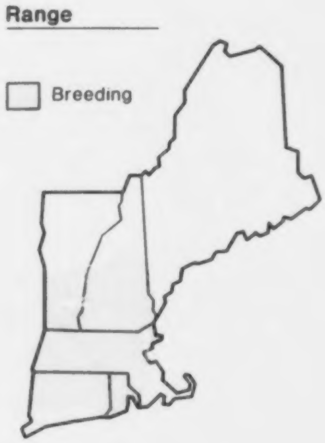
Louisiana Waterthrush

(Seiurus motacilla)

A.O.U. No. 676.0





RANGE: Breeding: From c. Nebraska, e. to s. Ontario, Vermont, and New Hampshire, s. to e. Oklahoma, e. Texas, Louisiana, across to ne. North Carolina. Winter: From s. Sonora, Mexico, Cuba, Bahamas, and Bermuda, s. to Panama, Trinidad, Colombia, and Venezuela.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Bottomland forests where moss-covered logs and rank undergrowth give an almost tropical character to the surroundings; wooded valleys of rocky brooks or small streams; sometimes in woods. Favors wooded streams and brooks with swiftly flowing water. Avoids high elevations.

SPECIAL HABITAT REQUIREMENTS: Woodlands with flowing water, especially streams and brooks (Pough 1949: 182).

NESTING: Egg dates: April 25 to June 20, New York (Bull 1974:510). Clutch size: 4 to 7, typically 5. Incubation period: 12 to 14 days. Nestling period: 10 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 1 to 6 feet (0.3 to 1.8 m). Typically on ground. Nest site: In cavity in bank of stream or among upturned roots of a fallen tree.

SAMPLE DENSITIES: Maryland — 16 territorial males per 100 acres (40 ha) in second-growth river swamp. 4 territorial males per 100 acres (40 ha) in well-drained floodplain forest (Stewart and Robbins 1958:304).

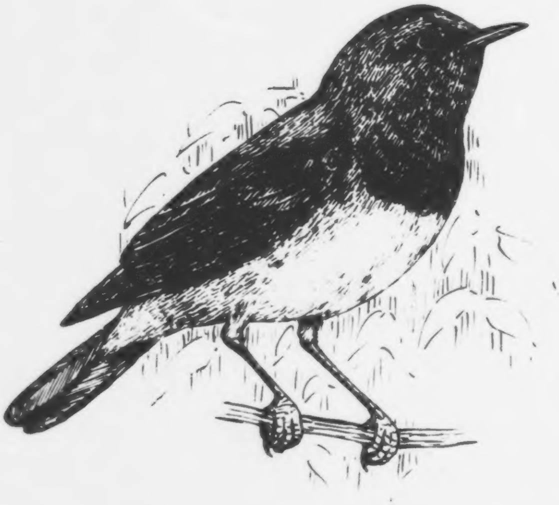
FORAGING: Major foods: Dragonfly and cranefly larvae, beetles, bugs, ants, caterpillars, scale insects, spiders, and mollusks. Substrates: Sandy margins of streams. Technique: Ground gleaning.

KEY REFERENCES: Bent 1953, Chapman 1907, Eaton 1958.

Mourning Warbler

(Oporornis philadelphia)

A.O.U. No. 679.0



Range
☐ Breeding

RANGE: Breeding: Southeastern Canada s. to the Berkshires, Catskills, Poconos, and higher elevations of West Virginia and Virginia, n. Minnesota, Michigan. Winter: Central America and n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon breeder.

HABITAT: Breeding: Dense underbrush on the margin of a lowland swamp or bog; bushy hillsides, forest clearings grown up to brambles, shrubs and saplings.

SPECIAL HABITAT REQUIREMENTS: Extensive stands of dense saplings, shrubs (Pough 1949:185).

NESTING: Egg dates: May 28 to July 7, New York (Bull 1974:514). Clutch size: 3 to 5, typically 4. Incubation period: 12 days. Nestling period: 7 to 9 days, or more (H. Harrison, personal communication). Broods per year: 1. Age at sexual maturity: 1 year. Nest height: To 2 feet (0.6 m) (rarely). Typically on ground. Nest site: On ground in tangles of briars, weeds, or grasses.

TERRITORY SIZE: 10 territories ranged from 1.6 to 2.4 acres (0.6 to 1.0 ha), average 1.9 acres (0.8 ha) in Minnesota (Cox 1960).

SAMPLE DENSITIES: 10 territorial males per 100 acres (40 ha) in dense second growth in Maryland (Stewart and Robbins 1958:308).

FORAGING: Major foods: Beetles, lepidopterans, spiders. Substrates: Thick underbrush. Techniques: Ground, shrub, stem gleaning.

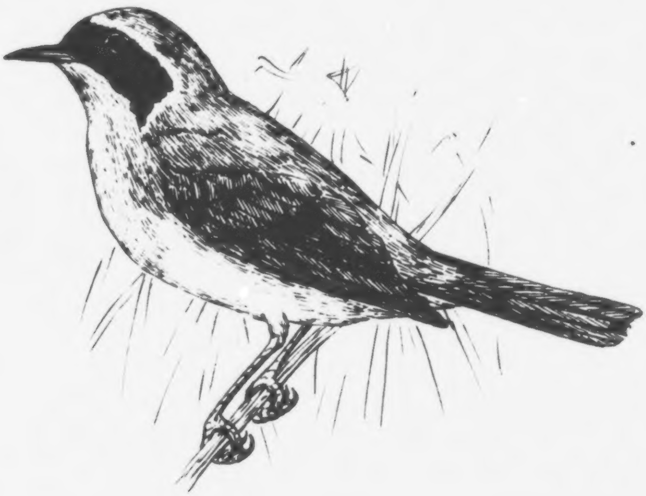
KEY REFERENCES: Bent 1953, Cox 1960, Griscom and Sprunt 1957.

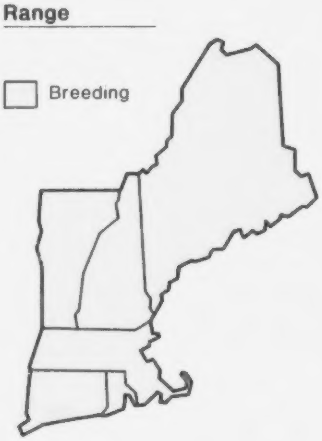
BEST COPY AVAILABLE

Common Yellowthroat

(Geothlypis trichas)

A.O.U. No. 681.0





RANGE: Breeding: Alaska and Canada s. to s. Mexico. Winter: Southern Maryland s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Wet brushy meadows and pastures, open swampy thickets on the margins of damp woods and woodland streams or ponds; in cattail beds of fresh or salt water marshes and dense tangles near water. Occasionally in dry thickets or dense undergrowth in open woodland.

NESTING: Egg dates: May 15 to July 12, New York (Bull 1974:515). Clutch size: 3 to 6, typically 4. Incubation period: 11 to 13 days. Nestling period: 9 to 10 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: To 3 feet (0.9 m). Typically on ground. Nest site: Among weeds, sedges or shrubs, in grassy tussocks, sometimes among ferns, or higher in low shrubs or tangles of briars.

TERRITORY SIZE: 0.8 to 1.8 acres (0.3 to 0.7 ha) per pair in the Geddes Marsh area (Michigan) (Stewart 1953); 7 pairs in 5 or 6 acres (2.0 to 2.4 ha), averaging less than 1 acre (0.4 ha) per pair in shrubby field habitat in New York (Kendeigh 1945).

SAMPLE DENSITIES: 9.7 males per square mile (4 males/km^2) (Stewart 1953). 69 males per 100 acres (40 ha) (Stewart 1953). 1 pair per 2 acres (0.8 ha) (Hofslund 1957). 111 territorial pairs per acres (40 ha) in hedgerow bordering brook in Maryland (Stewart and Robbins 1958:309).

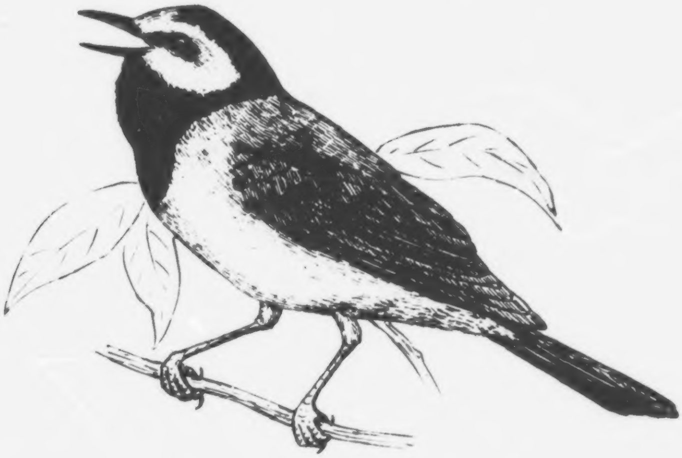
FORAGING: Major foods: Cankerworms, fall webworms, gypsy moths, caterpillars, grasshoppers, leafhoppers, plant lice, spiders. Substrates: Ground (in grasses); low shrubs. Techniques: Shrub and ground gleaning.

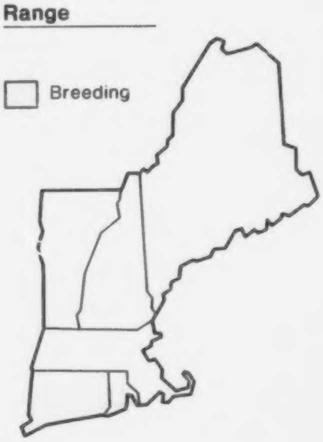
KEY REFERENCES: Forbush 1929, Stewart 1953.

Hooded Warbler

(Wilsonia citrina)

A.O.U. No. 684.0





RANGE: Breeding: Connecticut, c. New York, s. Michigan, n. Iowa, and se. Nebraska, s. to n. Florida and the Gulf Coast w. to Louisiana. Winter: Mexico to Panama.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Most often in brushy, swampy lowlands, less frequently at edges and interiors of well-watered mature deciduous woodlands with dense undergrowth or on rich, moist hillsides in thickets of laurel. Favors lowlands.

SPECIAL HABITAT REQUIREMENTS: Low, dense, woody vegetation (deciduous).

NESTING: Egg dates: May 25 to July 10, New York (Bull 1974:518). Clutch size: 3 to 5. Incubation period: 12 days. Nestling period: 8 days, probably more (H. Harrison, personal communication). Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 1 to 6 feet (0.3 to 1.8 m). Typically 2 to 3 feet (0.6 to 0.9 m). Nest site: Above ground in a bush, sapling, or herbaceous vegetation.

SAMPLE DENSITIES: Maryland — 32 territorial males per 100 acres (40 ha) in second-growth river swamp. 32 territorial males per 100 acres (40 ha) in young second growth. 17 territorial males per 100 acres (40 ha) in open slash area. 8 territorial males per 100 acres (40 ha) in upland oak forest (Stewart and Robbins 1958:313).

FORAGING: Major foods: Grasshoppers, locusts, caterpillars, plant lice, wasps, ants, moths, beetles, flies, bugs, caddis flies. Substrate: Air. Technique: Hawking.

KEY REFERENCES: Bent 1953, Forbush 1929.

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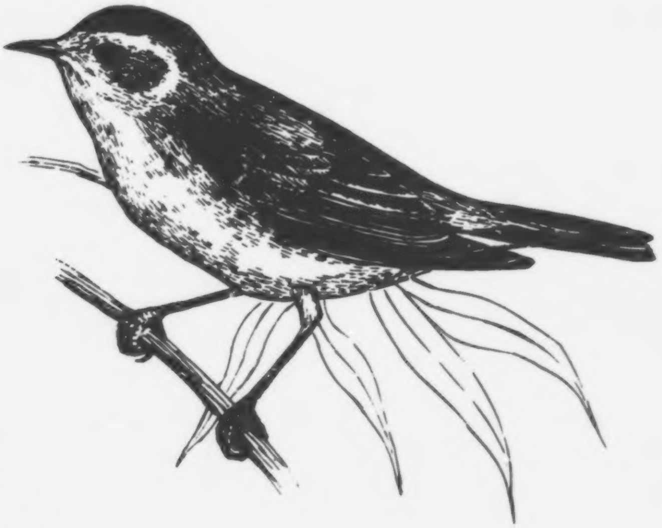
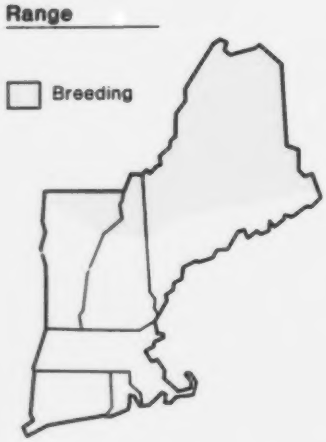
Wilson's Warbler

(Wilsonia pusilla)

A.O.U. No. 685.0





RANGE: Breeding: Eastern Canada s. to c. Maine, n. New Hampshire, n. Vermont and n. Minnesota. Winter: Mexico s. to Panama.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Swampy, brushy land, such as tamarack bogs or swampy runs, willow and alder swales. Generally stays low, within 10 feet (3.0 m) of ground (Pough 1949:190).

NESTING: Egg dates: June 6 to June 21, New Brunswick (Bent 1953:639). Clutch size: 4 to 6, typically 5. Incubation period: 11 to 13 days. Nestling period: 10 to 11 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: On or sunken in the ground; usually among brushes, such as alders or smaller shrubs, or at base of sapling. May nest in loose colonies in favorable habitat.

TERRITORY SIZE: Mean 0.57 ha (1.4 acres), range 0.2 to 1.3 ha (0.5 to 3.2 acres); mean 0.48 ha (1.2 acres), range 0.3 to 1.0 ha (0.7 to 2.47 acres), in California (Stewart 1973).

FORAGING: Major foods: Flies, gnats, plant lice, small caterpillars, other larvae, small grasshoppers, spiders. Substrates: Twigs to 25 feet (7.6 m) above ground (MacArthur 1959). Techniques: Hopping and twig gleaning.

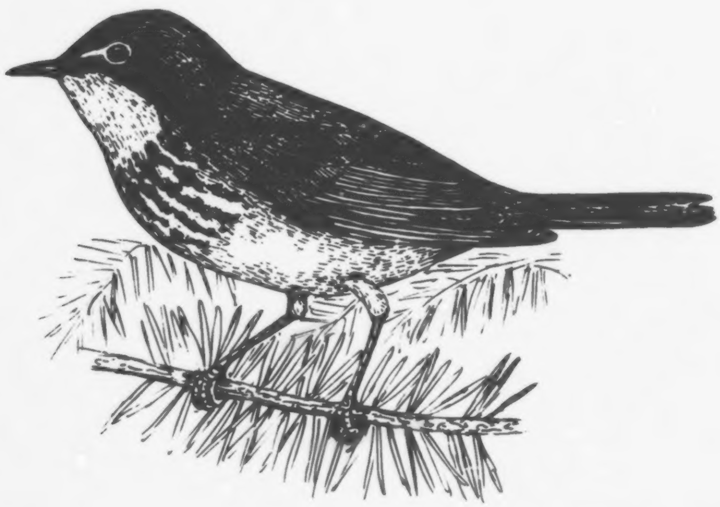
COMMENTS: Diet 93 percent insect (Beal 1907 in Bent 1953:630).

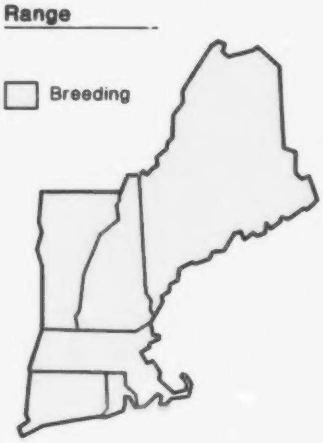
KEY REFERENCES: Bent 1953, Forbush 1929, Stewart 1973.

Canada Warbler

(Wilsonia canadensis)

A.O.U. No. 686.0





RANGE: Breeding: Southern Canada to n. New Jersey and se. New York, s. in the mountains to Georgia. Rarely to s. New England coast. Winter: Central and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine and elsewhere at higher elevations).

HABITAT: Breeding: Occupies a variety of habitats from lowlands to uplands, coniferous to deciduous. Favors shrubby undergrowth in cool, moist, mature woodlands, aspen and cherry "burns," streamside thickets, cedar bogs, weedy ravines and, less often, dry forest edge with young trees.

NESTING: Egg dates: May 31 to June 30, New York (Bull 1974:521). Clutch size: 3 to 5, typically 4. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: On or near the ground, atop mossy logs or stumps, cavities in banks or amid roots of windthrows, among fern stands. Nests are usually in the vicinity of a stream, pond, or other body of water.

TERRITORY SIZE: 1 male occupied a singing area of 0.6 acre (0.2 ha) until nesting began, at which time he expanded his movements to 2 acres (0.8 ha). Another male roamed 3 acres (1.2 ha) after nesting began (New York) (Kendeigh 1945). Habitat: hemlock-beech.

SAMPLE DENSITIES: Maryland — 45 territorial males per 100 acres (40 ha) in dense oak-maple second growth. 32 territorial males per 100 acres (40 ha) in young second-growth (after cutting). 21 territorial males per 100 acres (40 ha) in open hemlock-spruce bog (Stewart and Robbins 1958:315).

FORAGING: Major foods: Mosquitoes, flies, moths, beetles, small hairless caterpillars, spiders. Substrates: Air, leaf litter. Techniques: Hawking, ground gleaning.

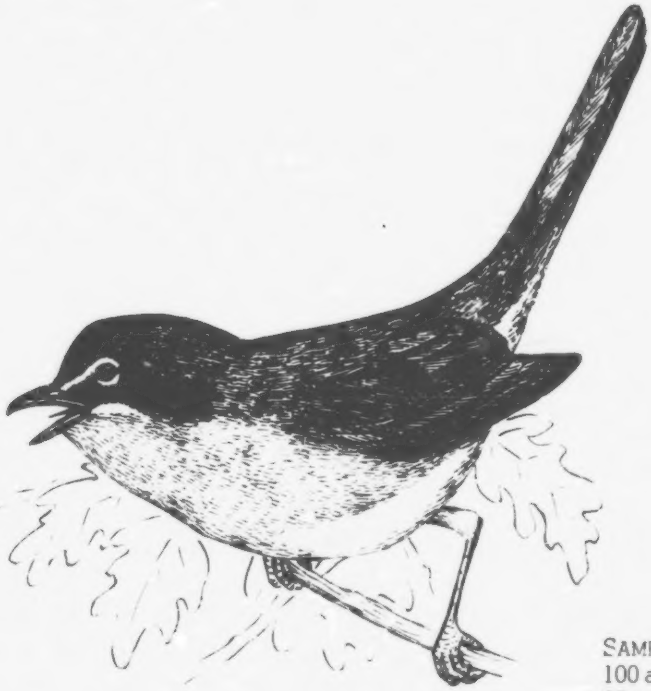
COMMENTS: Diet consists wholly of insects and spiders. The bird is an expert flycatcher.

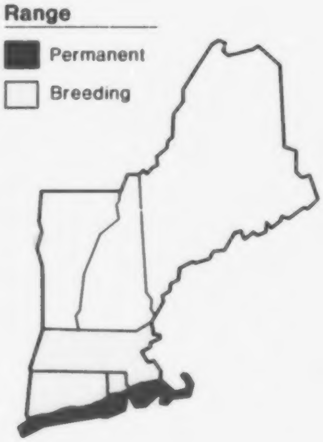
KEY REFERENCES: Griscom and Sprunt 1957, Harrison 1975.

Yellow-breasted Chat

(Icteria virens)

A.O.U. No. 683.0





RANGE: Breeding: Southern British Columbia e. to s. Ontario, and Massachusetts, s. to se. Texas, the Gulf states and n. Florida. Winter: Mexico and Central America to Panama; irregularly in small numbers to coastal sections of se. Massachusetts.

RELATIVE ABUNDANCE IN NEW ENGLAND: Local breeder from central Massachusetts south.

HABITAT: Breeding: Brushy pastures, thickets or briar patches, usually near water. Clearings with young growth resulting from logging or burning. Avoids high elevations. Wintering: Dense thickets.

SPECIAL HABITAT REQUIREMENTS: Dense shrubs and vines with scattered young trees, often near water.

NESTING: Egg dates: May 25 to July 13, New York (Bull 1974:516). Clutch size: 3 to 5, typically 4. Incubation period: 11 days (H. Harrison personal communication). Broods per year: 1. Age at sexual maturity: 1 year. Nest height: To 5 feet (1.5 m), typically 3 feet (0.9 m). Nest site: In a bush, small sapling or tangle of grapevines, catbrier, brambles, and so on, occasionally on the ground.

TERRITORY SIZE: 1.2 to 2.5 acres (0.5 to 1.0 ha) per pair, though individuals may roam well into a neighboring territory. Habitat: grown-over abandoned fields in northern Virginia (Dennis 1958).

SAMPLE DENSITIES: Maryland — 36 territorial males per 100 acres (40 ha) in shrubby field with trees and stream. 28 territorial males per 100 acres (40 ha) in deciduous scrub (damp) with snags. 15 territorial males per 100 acres (40 ha) in dry deciduous scrub resulting from fire (Stewart and Robbins 1958:311).

FORAGING: Major foods: Beetles, bugs, ants, wasps, weevils, mayflies, various caterpillars including tent caterpillars and currant-worms, raspberries, whortleberries, wild strawberries, blackberries, wild grapes. Substrates: Brush and saplings. Techniques: Shrub stem and foliage gleaning.

COMMENTS: Diet is largely insects (Howell 1932 in Bent 1953:591).

KEY REFERENCES: Bent 1953, Forbush 1929, Thompson and Nolan 1973.

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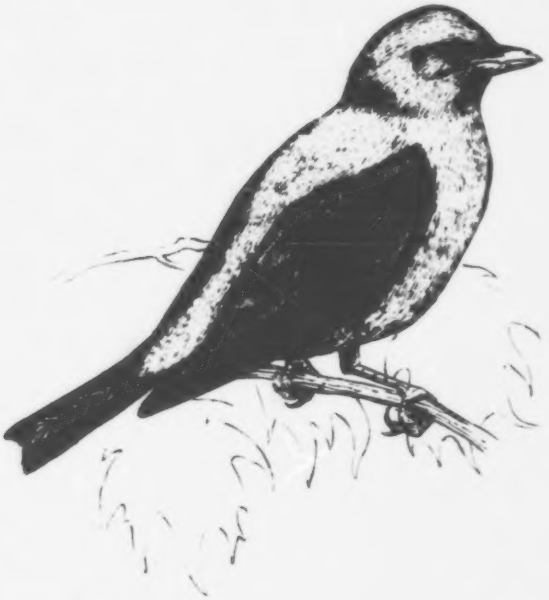
Scarlet Tanager

(Piranga olivacea)

A.O.U. No. 608.0



Range
☐ Breeding

RANGE: Breeding: Nova Scotia, w. through e. Maine to s. Saskatchewan, s. to the coast of Virginia and s. Kansas. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common and widespread.

HABITAT: Breeding: Mature deciduous and mixed woodlands, roadside shade trees. Often in pine-oak and oak-hickory woodlands. 68 percent of 28 nests in oak-hickory woods and tamarack swamp were in trees with a d.b.h. greater than or equal to 9 inches (23 cm) (Prescott 1965:21).

SPECIAL HABITAT REQUIREMENTS: Deciduous or mixed woodlands.

NESTING: Egg dates: May 20 to July 23, New York (Bull 1974:544). Clutch size: 3 to 5, typically 4. Incubation period: 13 to 14 days. Nestling period: About 15 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 8 to 75 feet (2.4 to 22.9 m). Typically 20 to 35 feet (6.1 to 10.7 m). Nest site: Usually placed well out from trunk on a horizontal branch in a leaf cluster or position where it is shaded from above and open to the ground below. It is usually placed where it can be approached by unobstructed flyways from adjacent trees (Prescott 1965:20).

SAMPLE DENSITIES: Maryland — 26 territorial males per 100 acres (40 ha) in virgin central hardwood deciduous forest. 15 territorial males per 100 acres (40 ha) in mature hardwood forest. 14 territorial males per 100 acres (40 ha) in dense second-growth (oak-maple) forest (Stewart and Robbins 1958:331).

FORAGING: Major foods: Insects, fruits. Substrates: Leaves and twigs of outer tips of limbs, dead branches. Techniques: Twig and leaf gleaning, flight-gleaning. Preferred feeding habitat: Canopy of forest trees.

COMMENTS: Seven-eighths of the diet is animal, and one-eighth is vegetable (McAtee 1929 in Bent 1958:485).

KEY REFERENCES: Bent 1958, Prescott 1965.

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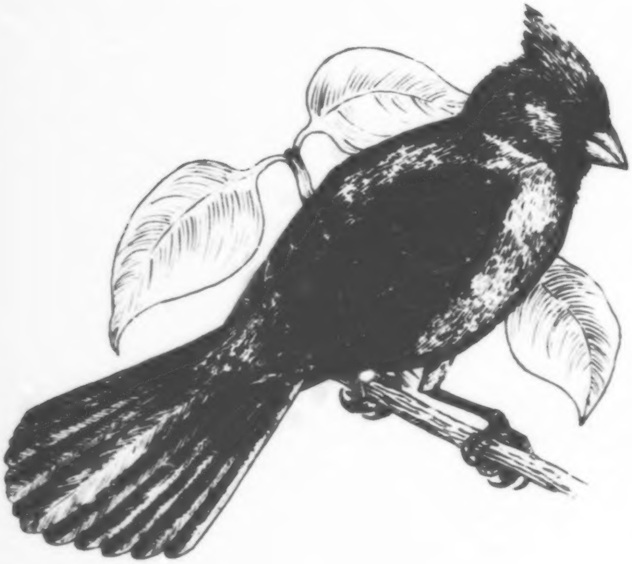
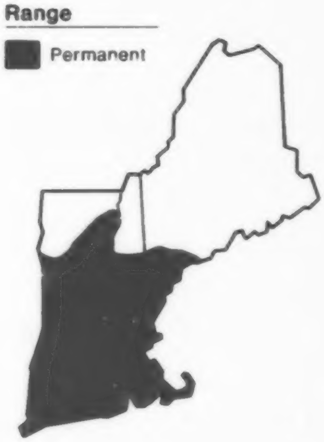
Northern Cardinal

(Cardinalis cardinalis)

A.O.U. No. 593.0





RANGE: Breeding: Central New England, w. to South Dakota, s. to Florida and Texas. Winter: Same as above.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Connecticut, Rhode Island, Massachusetts) to uncommon (Maine).

HABITAT: Breeding: Forest edges, open woodlands (less common in deep forest unless thickets are present), groves, parks, suburban gardens, open swamps, residential areas, parks. Wintering: Same. Easily attracted to feeding stations with sunflower seeds.

SPECIAL HABITAT REQUIREMENTS: Heavy underbrush such as *Lonicera* spp. or *Cornus* spp.

NESTING: Egg dates: April 10 to September 9, New York (Bull 1974:548). Clutch size: 2 to 5, typically 3. Incubation period: 12 to 13 days. Nestling period: About 14 days. Broods per year: 2 or 3. Age at sexual maturity: 1 year. Nest height: 3 to 20 feet (0.9 to 6.1 m), typically less than 10 feet (3.0 m). Nest site: In dense shrubs, small deciduous or coniferous trees, tangles of vines, thickets, briars.

HOME RANGE: 0.51 to 2.32 ha (1.3 to 5.7 acres) (average 1.18 ha (2.9 acres)) in Tennessee, but 10.97 to 23.24 ha (27.1 to 57.4 acres) (average 18.81 ha (46.5 acres)) in Ontario (Dow 1969). 0.31 to 0.45 acres (0.1 to 0.2 ha) (average 0.37 acre (0.1 ha)) in swamp thicket in Illinois (Brewer 1955). Cardinals range no further than a few miles from their territory during their lifetime (Laskey 1944).

SAMPLE DENSITIES: 30 males per 100 acres (40 ha) in oak-hickory forests with clearings and hedgerows in Tennessee. 0.48 males per 100 acres (40 ha) in beech-maple woodlots in Ontario (Dow 1969). 23 territorial males per 100 acres (40 ha) in semi-open floodplain forest. 5 territorial males per 100 acres (40 ha) in field and edge (Stewart and Robbins 1958:333).

FORAGING: Major foods: Seeds and fruits, waste grains, insects. Substrate: Ground. Technique: Ground gleaning.

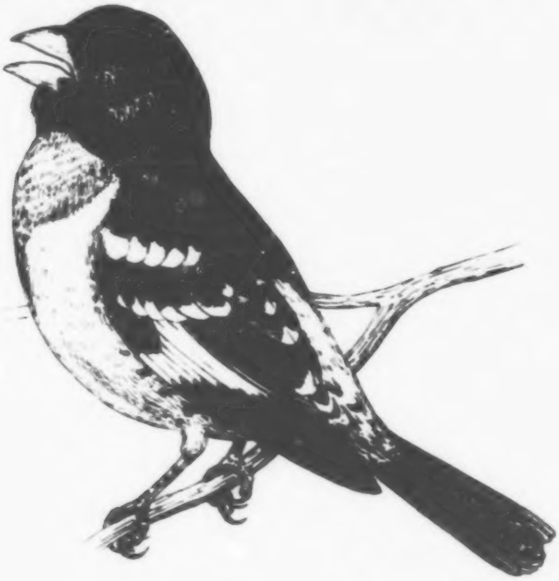
COMMENTS: Possibly life-long monogamy.

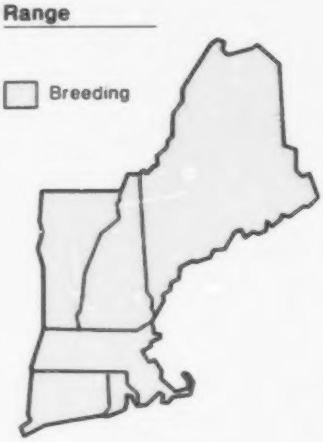
KEY REFERENCES: Bent 1968, Dow 1969, Laskey 1944.

Rose-breasted Grosbeak

(Pheucticus ludovicianus)

A.O.U. No. 595.0





RANGE: Breeding: Nova Scotia, w. to Manitoba, s. to c. New Jersey, Georgia (mountains) and the lower Midwest. Winter: Mexico to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Edges of moist deciduous second-growth woods, wooded borders of swamps and streams, thickets, suburban trees, old orchards.

SPECIAL HABITAT REQUIREMENTS: An edge. Ideal habitat is the interface of tall forest trees and fields with dense high shrubs and tangles (Pough 1949:217).

NESTING: Egg dates: May 6 to July 19, New York (Bull 1974:549). Clutch size: 3 to 6, typically 4. Incubation period: 12 to 14 days. Nestling period: 9 to 12 days. Broods per year. 1 or 2. Age at sexual maturity: 1 year. Nest height: 6 to 26 feet (1.8 to 7.9 m). Typically 10 to 12 feet (3.0 to 4.6 m). Nest site: Usually built in the fork of a deciduous tree. Less commonly placed in a deciduous or evergreen shrub.

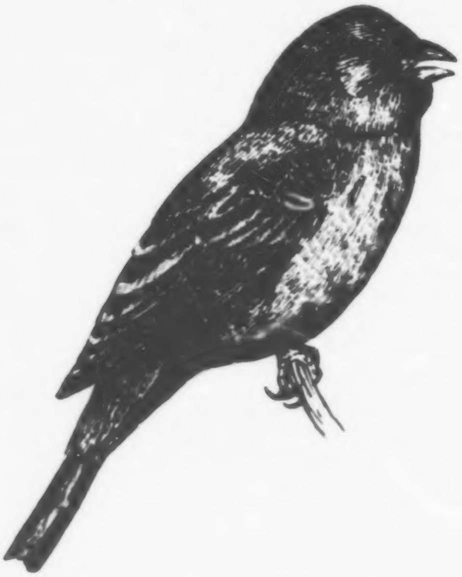
FORAGING: Major foods: Insects and spiders (about 50 percent); the balance of diet is seeds, fruits. Substrates: Ground, tree canopy. Techniques: Ground, twig, leaf gleaning.

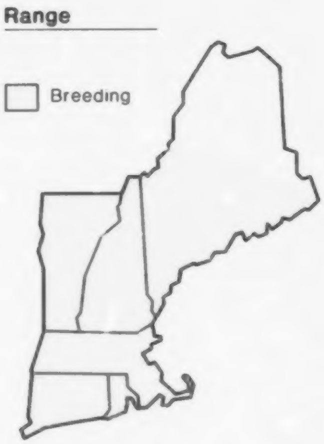
KEY REFERENCES: Bent 1968, Gabrielson 1915.

Indigo Bunting

(Passerina cyanea)

A.O.U. No. 598.0





RANGE: Breeding: New Brunswick, w. to North Dakota, s. to Georgia and Texas. Winter: Mexico and Central America. (Casually n. along coast to Massachusetts.)

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Edges of woods, old burns, open brushy fields, roadside thickets, brushy ravines. Tends to be numerous along creeks and rivers. Avoids deep woods.

SPECIAL HABITAT REQUIREMENTS: Brushy vegetation, elevated perches.

NESTING: Egg dates: May 26 to August 3, New York (Bull 1974:551). Clutch size: 2 to 6, typically 3 or 4. Incubation period: 12 to 13 days. Nestling period: 10 to 13 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest Height: 2 to 12 feet (0.6 to 3.7 m), typically 3 feet (0.9 m). Nest site: In dense cover, usually in weeds or in fork of shrub, low tree, or in brambles.

TERRITORY SIZE: 2.7 acres (1.1 ha) in sapling, shrub and vine habitat in Kansas (Fitch 1958). Average 0.26 acre (0.1 ha) in swamp-thicket in Illinois (Brewer 1955)

SAMPLE DENSITIES: 5 nests per 7.08 acres (2.9 ha) in thickets (Beecher 1942). 9 to 18 pairs per mile (1.6 km) in forest edge (Johnston 1947). 13 pairs per 25 acres (10.1 ha) in apple orchard (Stewart and Robbins 1958:337).

FORAGING: Major foods: Insects, weed seeds. Substrates: Branches, leaf surfaces, bare soil. Techniques: Ground, twig gleaning. Preferred feeding habitat: Cornfields in late summer.

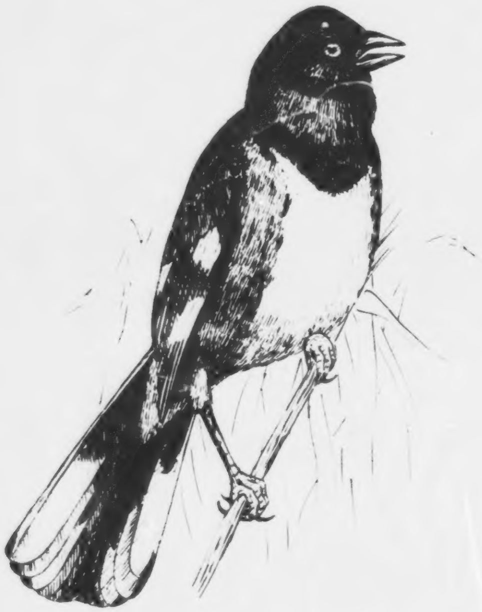
COMMENTS: Forest clearings created by logging and burning have been used extensively by the birds in the Northeast and have led to range expansion. The feeding habits are not well known. Summer diet is mainly insects and winter is mainly seed.

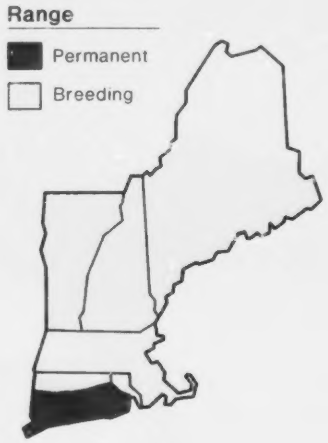
KEY REFERENCES: Allen 1933b, Bent 1968, Bradley 1948.

Rufous-sided Towhee

(Pipilo erythrophthalmus)

A.O.U. No. 587.0





RANGE: Breeding: Central Maine, w. to se. Saskatchewan, s. to Florida, n. Louisiana and Oklahoma. Winter: Southern New England, w. to s. British Columbia, s. to Florida, Mexico, and s. California. Absent from mountains.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in breeding season. Uncommon in winter (Connecticut coast).

HABITAT: Breeding: Woodland edges and dry open interiors and clearings, hedgerows, roadside thickets, brushy hillsides and pastures. Wintering: Similar to breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Dense brushy cover (Pough 1949:239).

NESTING: Egg dates: May 15 to August 4, New York (Bull 1974:570). Clutch size: 3 to 6, typically 3 or 4. Incubation period: 12 to 13 days. Nestling period: 10 to 12 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: To 5 feet (1.5 m), typically on ground. Nest site: On or near ground in brushy cover or low in a shrub.

SAMPLE DENSITIES: 104 pairs per square mile (40 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 50 territorial males per 100 acres (40 ha) in dry deciduous scrub; 33 territorial males per 100 acres (40 ha) in open slash area; 32 territorial males per 100 acres (40 ha) in young second-growth (following cutting); 6 territorial males per 100 acres (40 ha) in young second-growth (following cutting); 6 territorial males per 100 acres (40 ha) in pine-oak forest (Stewart and Robbins 1958:348).

FORAGING: Major foods: Insects, seeds, fruits, mast. Substrate: Leaf litter of forest floor. Techniques: Scratching, gleaning, scattering leaves with beak.

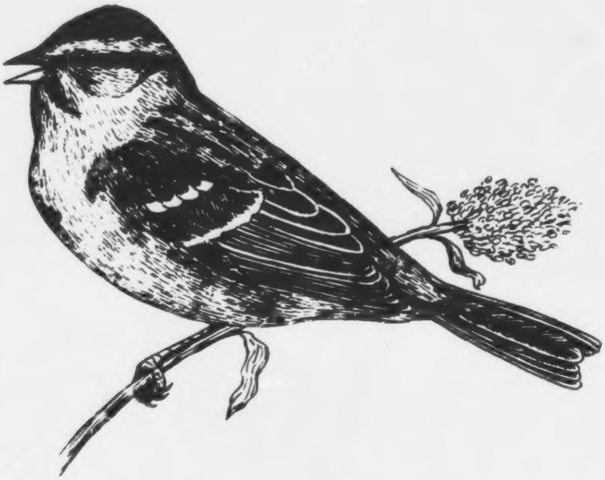
COMMENTS: McAtee (1926 in Bent 1968:570) found that 30 percent of the diet is animal matter and 70 percent vegetable matter.

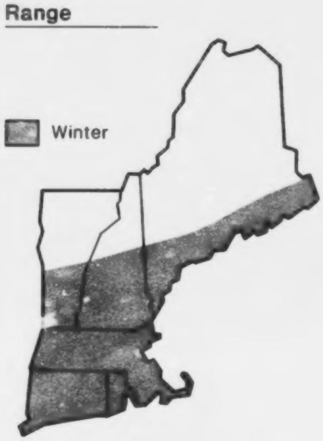
KEY REFERENCES: Bent 1968, Davis 1960.

American Tree Sparrow

(Spizella arborea)

A.O.U. No. 559.0





RANGE: Breeding: Quebec, w. to Alaska, s. to Newfoundland, n. Manitoba and n. British Columbia. Winter: Maritime Provinces, w. to s. British Columbia, s. to South Carolina, New Mexico and n. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Wintering: Open country, brushy edges of fields, weedy pastures, marshes, hedgerows, farmland.

FORAGING: Major foods: Winter—grass and weed seeds. Substrates: Leaf litter, grasses, and weeds. Techniques: Ground gleaning. Preferred feeding habitat: See wintering habitat.

COMMENTS: Individuals may wander several miles from winter range in search of food (Sargent 1959).

KEY REFERENCES: Bent 1968, Heydweiller 1935.

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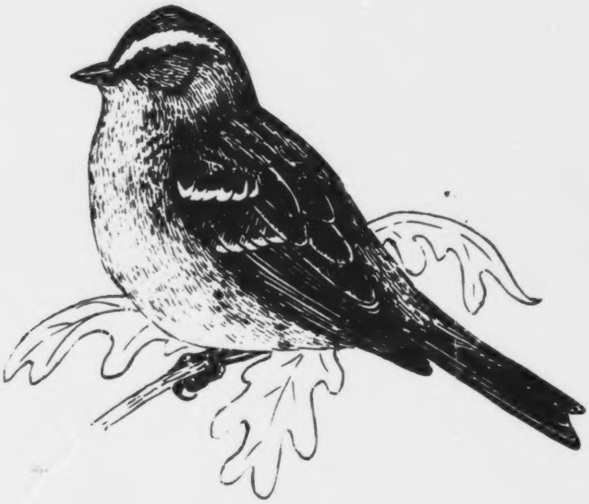
Chipping Sparrow

(Spizella passerina)

A.O.U. No. 560.0



Range
Breeding

RANGE: Breeding: Nova Scotia, w. to the Yukon, s. to Georgia and Central America. Winter: Southern Maryland, w. to Texas and s. California, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Suburban residential areas, farms, orchards, open mixed woodlands, clearings in forests and woodland edges, borders of lakes and streams.

NESTING: Egg dates: May 2 to July 19, New York (Bull 1974:583). Clutch size: 2 to 5, typically 3 or 4. Incubation period: 11 to 14 days. Nestling period: 7 to 8 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest height: 1 to 25 feet (0.3 to 7.6 m). Typically 3 to 10 feet (0.9 to 3.0 m). Nest site: In a tree, shrub or vine; rarely on ground. Nest is often low in ornamental evergreen, typically well concealed.

TERRITORY SIZE: 1 to 1.5 acres (0.4 to 0.6 ha) in residential area in Michigan (Walkinshaw 1944). Two-thirds of an acre (0.3 ha) in Michigan (Sutton 1960). 7.6 acres (3.1 ha) in South Carolina (Odum and Kuenzler 1955).

SAMPLE DENSITIES: Maryland—90 territorial males per 100 acres (40 ha) in suburban residential area with orchard and lawn. 48 territorial males per 100 acres (40 ha) in unsprayed apple orchard. 18 territorial males per 100 acres (40 ha) in mixed agricultural habitats, including hedgerows and wood margins (Stewart and Robbins 1958:363).

FORAGING: Major foods: Insects, seeds. March through November diet: 38 percent animal, 62 percent vegetable (Judd 1900 in Bent 1968:1175). Substrates: Weeds, grasses. Technique: Ground gleaning. Preferred feeding habitat: Areas with abundant weeds.

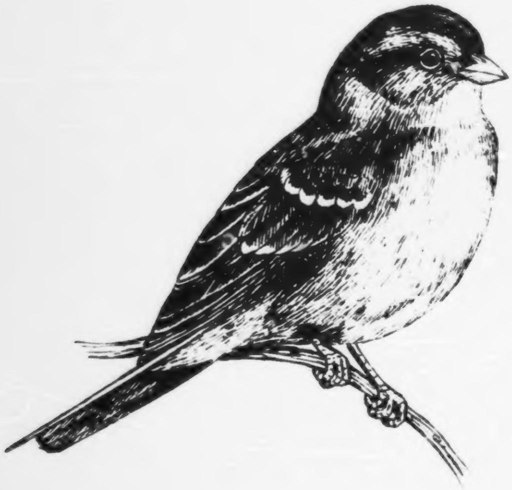
COMMENTS: Walkinshaw (1944) found that nest heights increased as breeding season progressed. Clearings in the forest caused by logging, fire, and so on, have increased Chipping Sparrow breeding habitat.

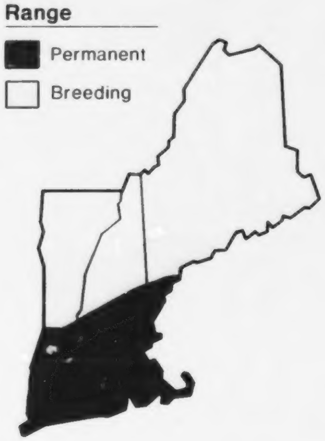
KEY REFERENCES: Bent 1968, Forbush 1929, Walkinshaw 1944.

Field Sparrow

(Spizella pusilla)

A.O.U. No. 563.0





RANGE: Breeding: Nova Scotia, w. to Montana, s. to South Carolina, Alabama and Texas. Winter: Southern New England, w. to Missouri, s. to Florida and Texas.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Massachusetts) to uncommon (Maine).

HABITAT: Breeding: Old fields with scattered woody vegetation, also uses abandoned hayfields, briar thickets, and woodland edges.

SPECIAL HABITAT REQUIREMENTS: Open areas with low shrubs or trees.

NESTING: Egg dates: May 16 to August 17 (second brood), New York (Bull 1974:586). Clutch size: 2 to 5, typically 3 or 4. Incubation period: About 11 days. Nestling period: 7 to 10 days. Broods per year: 2 or 3. Age at sexual maturity: 1 year. Nest height: To 4 feet (1.2 m), typically on ground. Nest site: Early nests are usually on or near the ground in a tuft of grass. Later nests may be up to 4 feet high (1.2 m) in shrubs or trees.

TERRITORY SIZE: 0.31 to 1.62 ha (0.8 to 4 acres) in shrub-grassland habitat in Illinois (Best 1977). 0.75 to 2.0 acres (0.3 to 0.8 ha) (average 1.3 acres (0.5 ha)) on semi-wooded hillsides or idle prairie grass pasture in Iowa (Crooks and Hendrickson 1953). Less than 2 acres to 5 or 6 (0.8 to 2 or 2.4 ha) in various habitats (Bent 1968:1220).

SAMPLE DENSITIES: 8 pairs per 10 acres (4 ha) in fallow field in Michigan (Berger in Bent 1968). 1 pair per 3 acres (1.2 ha) in suitable habitat in Michigan (Walkinshaw 1939b). 80 males per 100 acres (40 ha) of unmowed apple orchard (Stewart and Robbins 1958:364).

FORAGING: Major foods: Insects (over 40 percent in summer), seeds of weeds and grasses. Substrate: Ground. Technique: Ground gleaning.

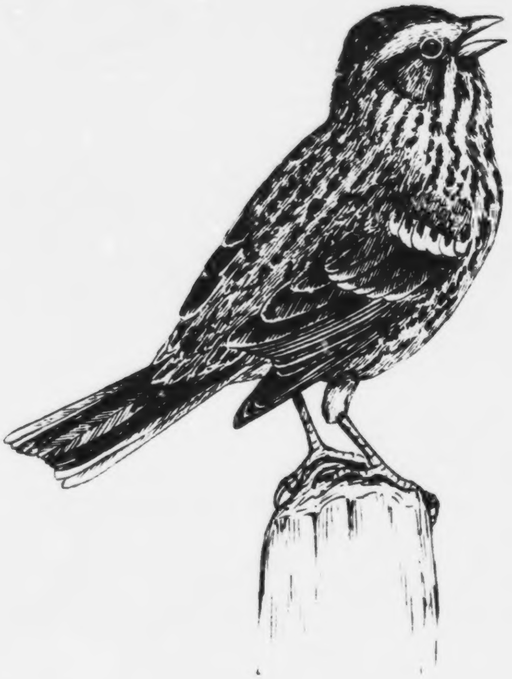
COMMENTS: The diet consists of about 41 percent animal matter and 59 percent vegetable matter (Judd 1901 in Bent 1968:1228).

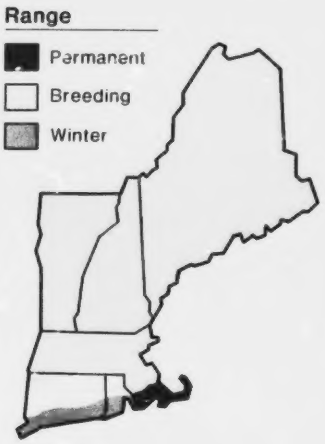
KEY REFERENCES: Bent 1968, Best 1977, 1978, Crooks 1948.

Vesper Sparrow

(Pooecetes gramineus)

A.O.U. No. 540.0





RANGE: Breeding: Nova Scotia, w. to s. British Columbia, s. to North Carolina, Texas and c. California. Winter: Southern New England s. to Florida, The Gulf States and Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (Maine).

HABITAT: Breeding: Short-grass meadows, pastures, hayfields, cultivated grain fields, dry open uplands, burned and cut-over areas in forests, country roadsides. Wiens (1969:41) found that birds favor sparsely vegetated uplands and may use areas with widely scattered shrubs.

SPECIAL HABITAT REQUIREMENTS: Open areas with short herbaceous vegetation, conspicuous singing perches.

NESTING: Egg dates: May 5 to August 16, New York (Bull 1974:581). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 12 to 13 days. Nestling period: 9 to 14 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest site: in or at base of grass tussock in depression in ground. Early nests may be completely exposed from above until concealed by surrounding growing vegetation.

TERRITORY SIZE: 1.2 to 1.8 acres (0.5 to 0.7 ha) per pair in uncultivated field in Michigan (Bent 1968:869). 1.5 to 2.7 acres (0.6 to 1.1 ha) (average 2.2 acres (0.9 ha)) for 5 territories in Wisconsin grasslands (Wiens 1969:35).

HOME RANGE: Home ranges are typically larger than those of other grassland sparrows (Bent 1968:869).

SAMPLE DENSITIES: 3 pairs per 10 acres (4 ha) in a fallow field bordered by woods in Michigan (Bent 1968:869). Range of 8 to 12 pairs annually in a 14-acre (5.7 ha) uncultivated field in Michigan (Bent 1968:869). 40 pairs per square mile (15 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 5 males per 80 acres (32.4 ha) in grassland in Wisconsin (Wiens 1969:53).

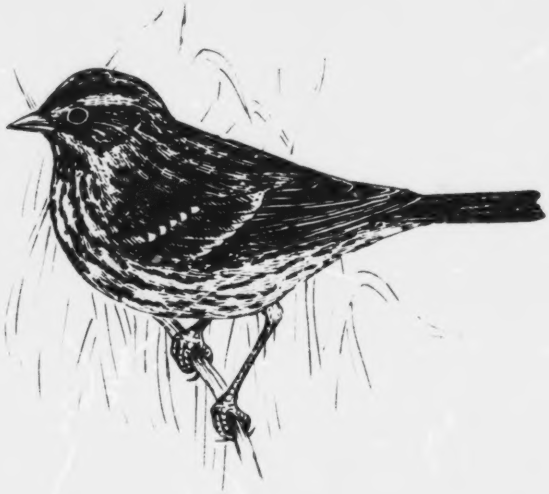
FORAGING: Major foods: Insects and other small invertebrates (33 percent), weed seeds (66 percent) (Bent 1968:875). Substrates: Grasses and weeds, sparsely vegetated ground. Technique: Ground gleaning.

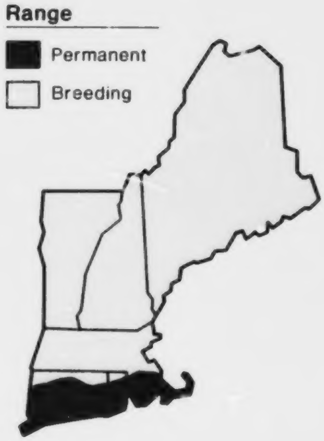
KEY REFERENCES: Bent 1968, Bryant 1931, Wiens 1969.

Savannah Sparrow

(Passerculus sandwichensis)

A.O.U. No. 542.0





RANGE: Breeding: Northern Labrador, w. to n. Alaska, s. to New Jersey, n. New Mexico and s. California. Winter: Massachusetts (Cape Cod), w. to Colorado and s. Alaska, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Grassy swales, hayfields, meadows, salt marshes. Habitat varies greatly in vegetation, moisture, and so on, but nest location and construction are consistently similar. Birds may favor moist lowland habitat with dense ground vegetation (Wiens 1969:41).

SPECIAL HABITAT REQUIREMENTS: Grasses and other vegetation of moderate height—neither short nor tall.

NESTING: Egg dates: May 11 to July 16, New York (Bull 1974:572). Clutch size: 3 to 6, typically 4 to 5. Incubation period: 10 days (Welsh 1975). Nestling period: 8 to 11 days. Average 9.4 days (Welsh 1975). Broods per year: 2. Age at sexual maturity: 1 year. Nest site: In hollow on ground, typically hidden by a canopy of surrounding vegetation, often in grass tufts. Colonial nesting has been reported but is infrequent.

TERRITORY SIZE: 0.16 to 1.09 ha (0.4 to 2.7 acres), (average 1.4 acre (0.57 ha)) for 16 territories in grasslands (Wiens 1973). 0.4 to 4.3 acres (0.2 to 1.7 ha) (average 1.7 acres (0.7 ha)) for 91 territories in grasslands in Wisconsin (Wiens 1969:35). 99 territories ranged from 0.21 to 1.91 ha (0.5 to 4.7 acres) in Nova Scotia (Stobo and McLaren 1975:32).

HOME RANGE: 0.2 to 0.8 acre (0.8 to 0.32 ha) (average 0.4 acre (0.17 ha)) in dune habitat in Nova Scotia (Welsh 1975).

SAMPLE DENSITIES: 115.9 pairs per km^2 (301 pairs/square mile) in grassland in Wisconsin (Wiens 1973). 37 territorial males per 80 acres (32.4 ha) in grasslands in Wisconsin (Wiens 1969:53). 120 pairs per square mile (46 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 50 territorial males per 100 acres (40 ha) in lightly grazed pasture in Maryland (Stewart and Robbins 1958:351).

FORAGING: Major foods: Insects, especially beetles and grasshoppers, seeds of grasses and weeds. Substrates: Grasses and weeds. Technique: Herb gleaning.

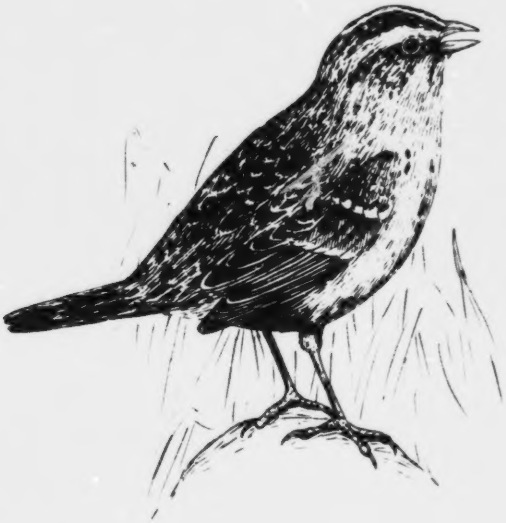
KEY REFERENCES: Bent 1968, Dixon 1978, Stobo and McLaren 1975, Welsh 1975, Wiens 1969, 1973.

BEST COPY AVAILABLE

Grasshopper Sparrow

(Ammodramus savannarum)

A.O.U. No. 546.0



Range
☐ Breeding

RANGE: Breeding: Southern New Hampshire, w. to British Columbia, s. to Florida, West Indies, and Central America. Winter: North Carolina, w. to c. California, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (Massachusetts) to rare and local (Vermont).

HABITAT: Breeding: Hayfields, weedy fallow fields, prairies. Avoids shrubby fields. Johnston and Odum (1956) reported that grasshopper sparrows were absent from fields with greater than 35 percent shrub cover. Birds favor uplands with ground vegetation of various densities (Wiens 1969:41).

SPECIAL HABITAT REQUIREMENTS: Continuous tall herbaceous cover. Conspicuous perches for singing.

NESTING: Egg dates: May 27 to August 6, New York (Bull 1974:580). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 12 to 13 days. Nestling period: 9 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest site: In a depression on the ground, usually well hidden by surrounding weeds and grasses. Prefers orchard grass, alfalfa, and clover. Birds are solitary or nest in small colonies.

TERRITORY SIZE: 6 territories averaged 3.4 acres (1.4 ha) in Iowa prairie (Kendeigh 1941 a). 0.32 to 1.34 ha (0.8 to 3.3 acres) (average 0.73 ha (1.8 acres)) for 16 territories in grasslands (Wiens 1973). 0.8 to 4.3 acres (0.3 to 1.7 ha) (average 2.1 acres (0.8 ha)) in grasslands in Wisconsin (Wiens 1969:35). 1.2 to 3.3 acres (0.5 to 1.3 ha) (average 2.0 acres (0.8 ha)) for 22 territories on a farm in West Virginia (Smith 1963).

SAMPLE DENSITIES: 92 pairs per km^2 (239 pairs/square mile) on grassland in Wisconsin (Wiens 1973). 30 territorial males per 80 acres (32.4 ha) in grasslands in Wisconsin (Wiens 1969:53). 60 pairs per square mile (23 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 77 territorial males per 100 acres (40 ha) in weedy fallow field in Maryland. 32 territorial males per 100 acres (40 ha) in weedy pasture in Maryland (Stewart and Robbins 1958:352).

FORAGING: Major foods: Insects, weed and grass seed. Substrates: Annual weeds and grasses, ground. Technique: Ground gleaning.

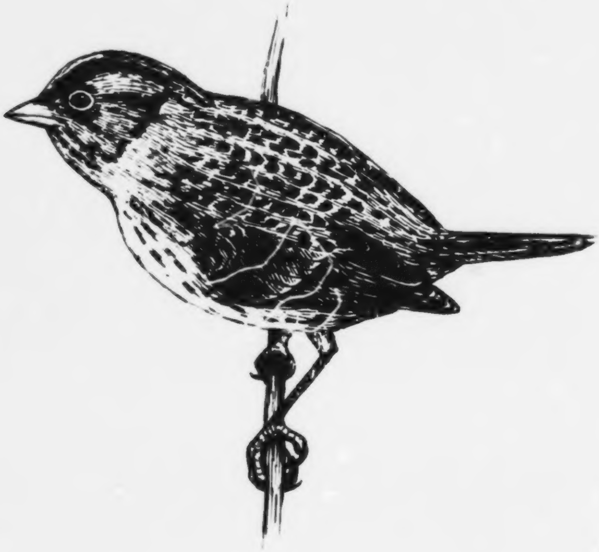
COMMENTS: Despite the availability of suitable habitat, grasshopper sparrow abundance fluctuates from year to year—reasons unknown. Judd (1901 in Bent 1968:735) found that the February to October diet contained 63 percent animal matter and 37 percent vegetable matter.

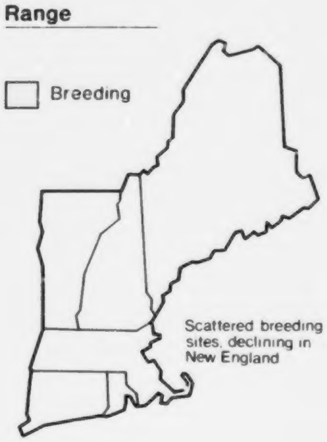
KEY REFERENCES: Bent 1968, Kendeigh 1941a, Smith 1963, Wiens 1969, 1973.

Henslow's Sparrow

(Ammodramus henslowii)

A.O.U. No. 547.0




Range
Breeding
Scattered breeding sites, declining in New England

RANGE: Breeding: Western New York, w. to South Dakota, s. to North Carolina and Texas. Winter: South Carolina, s. to Florida and w. along the Gulf Coast to Texas.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare, local.

HABITAT: Breeding: Neglected weedy fields—commonly of broomsedge—wet meadows, saltmarsh edges. Occasionally in dry and cultivated uplands. Wiens (1969:41) observed birds in areas with dense ground vegetation. May favor moist lowland habitat and may use areas with widely scattered shrubs.

SPECIAL HABITAT REQUIREMENTS: Dense herbaceous vegetation, moderate amounts of moisture, ground litter, singing perches (Robins 1971).

NESTING: Egg dates: May 17 to July 5, New York (Bull 1974:579). Clutch size: 3 to 5, typically 4. Incubation period: about 11 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest site: Solitary or loosely colonial. Nest is usually in a depression on the ground beside or atop a grass tussock and well hidden by the surrounding vegetation.

TERRITORY SIZE: 36 territories averaged 0.8 acres (0.3 ha) in hayfield in Michigan (Robins 1971). 8 territories averaged 1.5 acres (range 0.7 to 2.7 acres) (average 0.6 ha, range 0.3 to 1.1 ha) in grasslands in Wisconsin (Wiens 1969:35).

SAMPLE DENSITIES: 50 males per 100 acres (40 ha) of hayfield in Michigan (Robins 1971). 12 pairs per 10 acres (4 ha) of dense grass in Pennsylvania (Sutton 1928). 4 territorial males per 80 acres (32.4 ha) in grasslands in Wisconsin (Wiens 1969:33). 15 territorial males per 100 acres (40 ha) in abandoned broomsedge field in Maryland (Stewart and Robbins 1958: 353).

FORAGING: Major foods: Insects, seeds of grasses and weeds. Substrates: Ground litter, weed stalks. Technique: Ground gleaning.

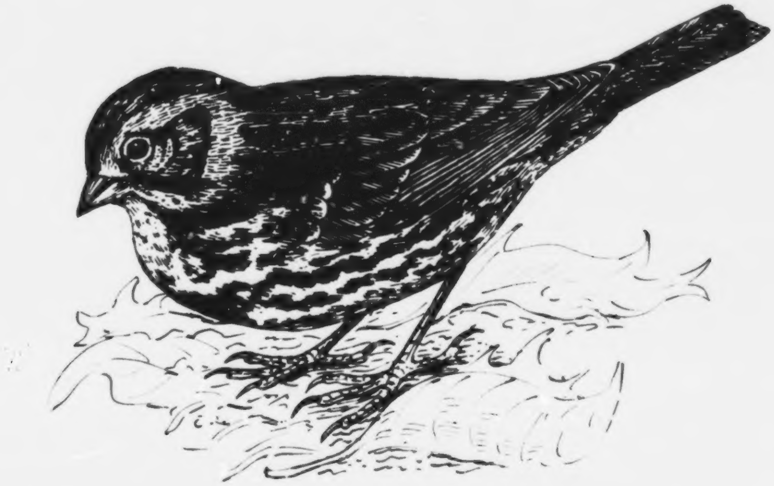
COMMENTS: Hyde (1939) found that the April to October diet consisted of 82 percent animal matter and 18 percent vegetable matter.

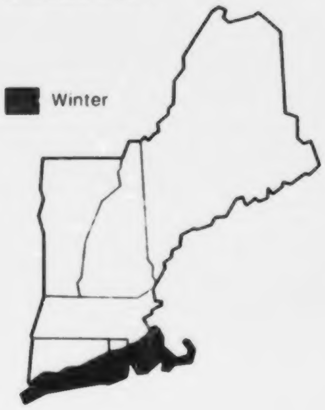
KEY REFERENCES: Bent 1968, Hyde 1939, Robins 1971, Wiens 1969.

Fox Sparrow

(Passerella iliaca)

A.O.U. No. 585.0





Range

RANGE: Breeding: Northern Quebec, w. to Alaska, s. to s. Quebec, Colorado and s. California. Winter: Coastal Massachusetts, s. to Florida, Pennsylvania, w. to British Columbia, s. to New Mexico and the Gulf States.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Wintering: Dense woodland thickets, brushy edges where field meets forest.

FORAGING: Major foods: Insects, weed seeds, fruits. Substrates: Leaf litter. Techniques: Scratching, ground gleaning.

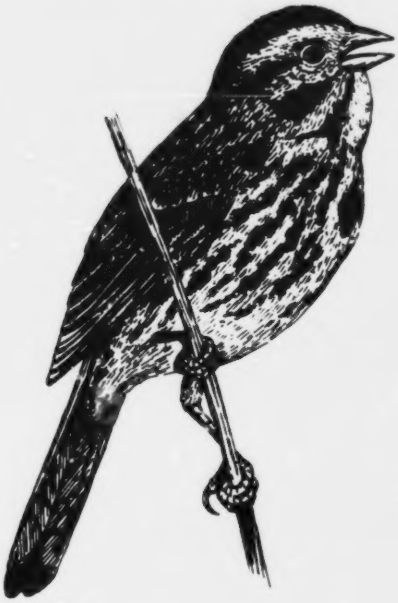
COMMENTS: Foods taken in all months of the year excluding June, July, and August consisted of 14 percent animal and 86 percent vegetable matter (Judd 1901 in Bent 1968:1404).

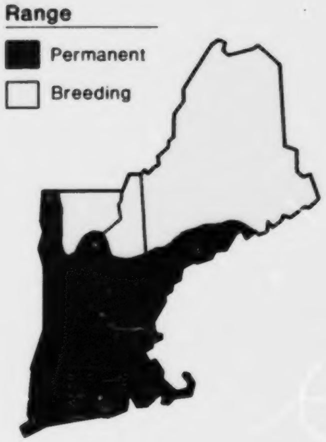
KEY REFERENCE: Bent 1968.

Song Sparrow

(Melospiza melodia)

A.O.U. No. 581.0





RANGE: Breeding: Nova Scotia, w. to s. Alaska, w. to coast to North Carolina and mountains of n. Georgia. Also to Missouri and Mexico. Winter: New Brunswick, w. to Wisconsin and British Columbia, s. to Florida and the Gulf States.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Breeding: Brushy fields, swamps, forest edges, roadsides, hedgerows, farms, suburbs, cities, shores of ponds and streams. Tolerates a wide range of habitat conditions. Wintering: Similar to breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Songposts (elevated perches).

NESTING: Egg dates: April 17 to August 11, New York (Bull 1974:600). Clutch size: 3 to 6, typically 3 to 5. Incubation period: 12 to 13 days. Nestling period: 10 to 14 days. Broods per year: 2 or 3. Age at sexual maturity: 1 year. Nest height: To 12 feet (3.7 m), typically 0 to 4 feet (0 to 1.2 m). Nest site: Early nests are usually on ground and are typically well hidden in grasses or weeds or concealed under a bush or brush pile. Subsequent nests may be on ground or elevated in a shrub. May raise height of successive nests with the growth of herbaceous vegetation. *Rosa multiflora* and *Rubus* spp. are preferred nest site vegetation (DeGraaf et al. 1975).

TERRITORY SIZE: Ranges from 0.5 to 1.5 acres (0.2 to 0.6 ha) in favorable habitat (Nice 1937:74). From 167 to 822 m^2 (0.1 to 0.6 acres) on an island off British Columbia (Tompa 1962).

HOME RANGE: Resident birds in winter may range over an area 6 to 10 times as large as territory (Nice 1937:63).

SAMPLE DENSITIES: Maryland—21 territorial males per 19.2 acres (7.8 ha) in shrubby field. 3 territorial males per 9.5 acres (3.8 ha) in open hemlock-spruce bog. 4.5 territorial males per 20.5 acres (8.3 ha) in infrequently mowed apple orchard (Stewart and Robbins 1958).

FORAGING: Major foods: Insects, weed seeds, fruits. Substrates: Grasses, stems and twigs of bushes. Techniques: Ground, herb and twig gleaning.

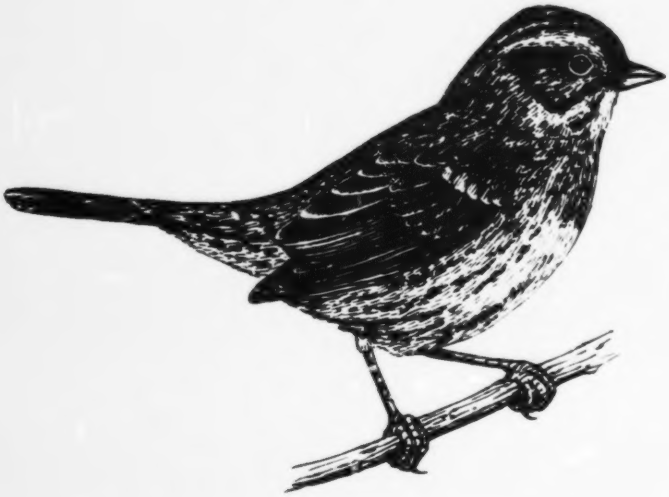
COMMENTS: Prefers wet lowland situations with low, irregular plant growth and abundant sunlight. Birds have been found nesting in small woodland openings only a few rods in diameter in New York (Eaton 1914).

KEY REFERENCES: Bent 1968, Nice 1937, 1943.

Lincoln's Sparrow

(Melospiza lincolnii)

A.O.U. No. 583.0



Range
☐ Breeding

RANGE: Breeding: Quebec, w. to Alaska, s. to n. New England, n. Minnesota, New Mexico and s. California. Winter: Southwestern United States, s. to Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Thickets of alder and willow along bogs, lakes, and streams. Natural brushy openings and clearings created by fire or cutting, dry rocky hillsides with low shrub growth.

SPECIAL HABITAT REQUIREMENTS: Needs low brushy growth 4 to 8 feet (1.2 to 2.4 m) high with openings of grasses or sedges (Bent 1968).

NESTING: Egg dates: June 10 to June 28, New York (Bull 1974:599). Clutch size: 3 to 6, typically 4 or 5. Incubation period: About 13 days. Nestling period: About 14 to 16 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest site: Often on tussock of grass or sedge or in mosses and lichens. Usually well hidden by surrounding vegetation.

TERRITORY SIZE: About 1 acre (0.4 ha) in forest edge habitat in Ontario (Bent 1968:1440).

FORAGING: Major foods: Insects (more than 60 percent in summer); weed seeds, grain. Substrate: Leaf litter. Technique: Ground gleaning.

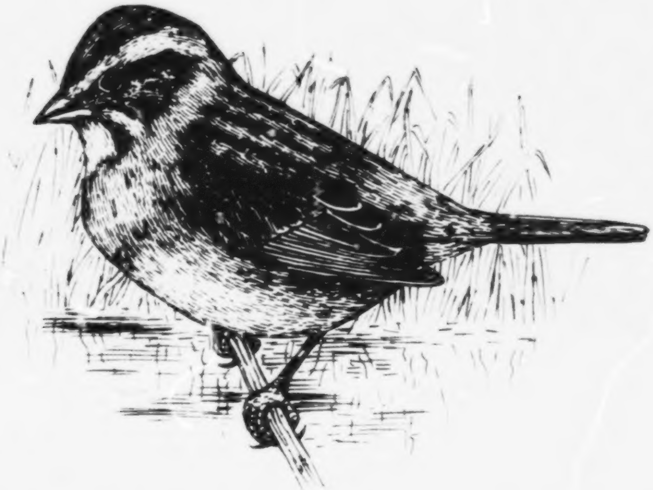
COMMENTS: 31 birds taken in Massachusetts and New York in February, April, May, September, and October had consumed 42 percent animal and 58 percent vegetable material (Judd 1901 in Bent 1968:1451).

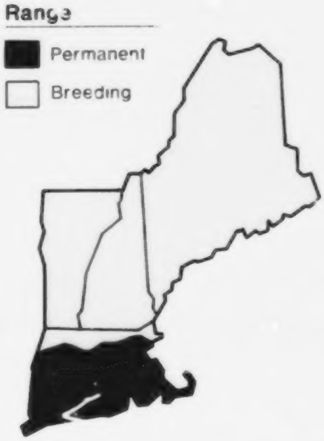
KEY REFERENCES: Bent 1968, Brewster 1936.

Swamp Sparrow

(Melospiza georgiana)

A.O.U. No. 584.0





RANGE: Breeding: Newfoundland, w. to c. Canada, s. to New Jersey and Maryland, n. Illinois and Nebraska. Winter: Southern New England, s. to Florida, the Gulf States, and Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Breeding: Marshes, swamps, bogs, sloughs with bushes, rank grasses, sedges or reeds, low swampy shores of lakes and streambanks. Usually near fresh water. Avoids heavily wooded wetlands.

NESTING: Egg dates: May 15 to July 22, New York (Bull 1974:599). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 12 to 15 days. Nestling period: 9 to 13 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest site: Often directly above water, on bent down grasses among cattails, or in a low bush. Frequently builds over water 0.5 to 2 feet (0.2 to 0.6 m) deep or more. Sutton (1960) found that birds preferred to nest in mixed vegetation (cattail, spirea, sedge, dwarf birch, and tamarack saplings) rather than in pure cattails.

SAMPLE DENSITIES: 21 birds per 100 acres (40 ha) in open hemlock-spruce bog in Maryland (Robbins 1949 in Bent 1968).

FORAGING: Major foods: Insects (more than 80 percent in spring and early summer), weed seeds (90 percent in late summer and fall). Substrates: Shallow water, marsh vegetation. Techniques: Wading, gleaning

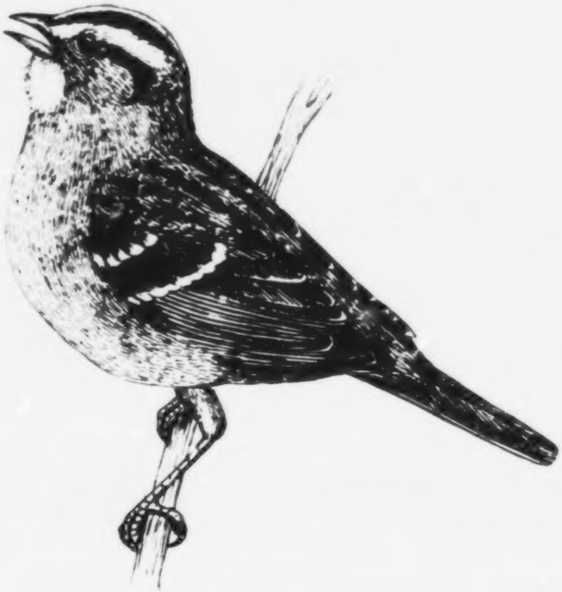
COMMENTS: Birds are highly insectivorous in spring and early summer (88 percent of diet), becoming almost entirely granivorous in late summer and fall (84 to 97 percent) (Martin et al. 1951).

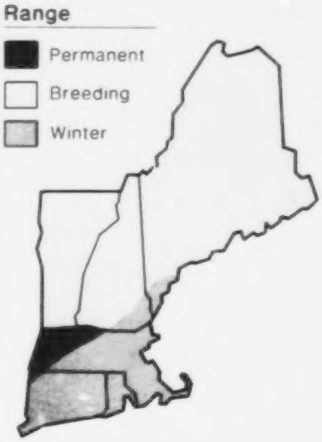
KEY REFERENCE: Bent 1968.

White-throated Sparrow

(Zonotrichia albicollis)

A.O.U. No. 558.0





RANGE: Breeding: Newfoundland, w. to n. Mackenzie, s. to n. New England, Massachusetts (Berkshires), New York (Catskills), Pennsylvania (Poconos), Wisconsin, and Alberta. Rarely to West Virginia. Winter: Central New England, s. to Florida, Pennsylvania, and Missouri, s. to the Gulf Coast and Mexico. Rarely to s. Canada.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon (Connecticut).

HABITAT: Breeding: Edges of northern deciduous and coniferous forests, brushy clearings, open stunted tree growth of higher elevations, border of bogs, cut-over and open second-growth woodlands.

NESTING: Egg dates: May 30 to July 21, New York (Bull 1974:595). Clutch size: 3 to 5, typically 4. Incubation period: 11 to 14 days. Nestling period: 12 to 14 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: To 3 feet (0.9 m), typically on ground. Nest site: On or close to ground, in brush pile, under fallen limb, in grass hummock or mat of dead grasses or bracken fern. Typically located at edge of a clearing and well concealed by ground vegetation.

TERRITORY SIZE: 110 territories ranged in size from 0.5 to 2.7 acres (0.2 to 1.1 ha), (average 0.52 acres 0.3 ha)) in Algonquin Provincial Park in Ontario (Martin 1960).

SAMPLE DENSITIES: Martin (1960) found densities varied from no birds in bog and hardwood forest to 56 territorial males per 100 acres (40 ha) in balsam fir and white spruce.

FORAGING: Major foods: Insects, seeds of grasses and weeds, wild fruits. Substrates: Weeds and grasses, leaf litter. Technique: Ground gleaning.

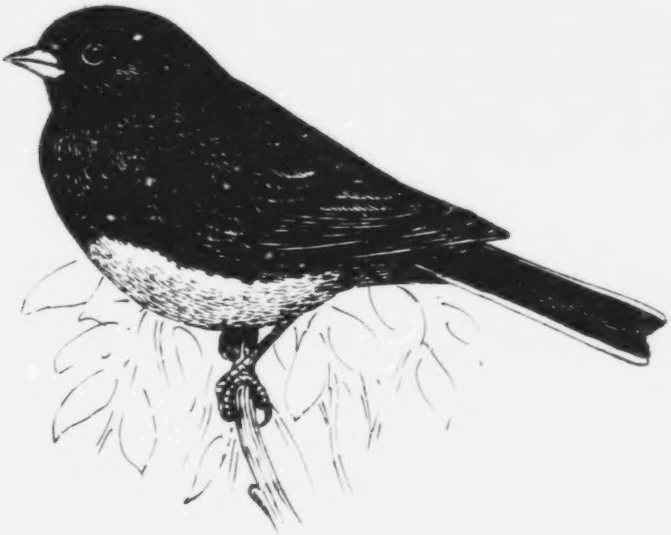
COMMENTS: Judd's (1901) analysis of the contents of 217 stomachs collected in all months except June revealed a diet of 19 percent animal and 81 percent vegetable matter (Bent 1968:1375).

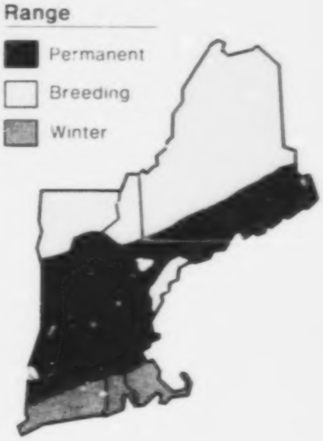
KEY REFERENCES: Bent 1968, Fischer and Gills 1946, Martin 1960.

Dark-eyed Junco

(Junco hyemalis)

A.O.U. No. 567.0





RANGE: Breeding: Quebec, w. to Alaska, s. to c. New England, Georgia (mountains), n. Minnesota and s. Yukon. In the West, s. to the mountains of sw. United States. Winter: Throughout most of the United States except the Florida peninsula and the extreme northern parts of breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Breeding: Coniferous and mixed forests, forest edges, (Johnston 1970) borders of streams, woodland clearings, sides of logging roads. Wintering: Areas with conifers for night roosting. Fretwell (1968) found that Juncos preferred open weedy fields and used mature deciduous and coniferous woods infrequently. Hedgerows and brushy field borders.

NESTING: Egg dates: April 28 to August 15, New York (Bull 1974:588). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 12 to 13 days. Nestling period: 9 to 12 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest site: Often on ground under weeds and grasses, on slope, under fallen log or at base of tree or roadbank in cavity formed by roads. Occasionally nests low in shrub or tree.

HOME RANGE: 27, 33, and 17 ha (66.7, 81.5, 42 acres) for 2 flocks (one flock used 2 home ranges) (Gottfried and Franks 1975).

FORAGING: Major foods: Insects, wild fruits, weed seeds. Substrates: Grasses, leaf litter, weeds. Technique: Ground gleaning. Preferred feeding habitat: Weed patches, hedgerows.

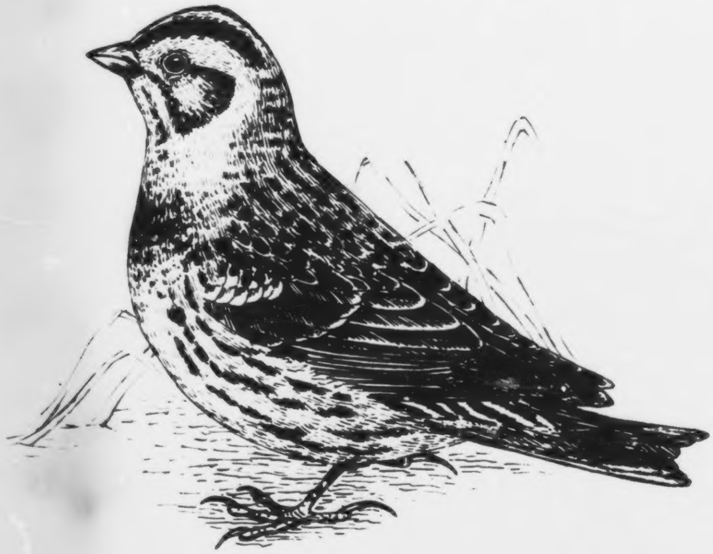
COMMENTS: Juncos feed on the ground in all seasons except when deep snow forces them to search in shrubs and forbs. Formerly Slate-colored Junco.

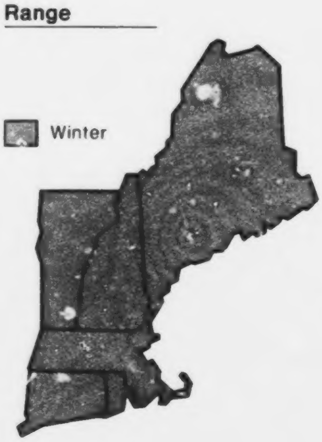
KEY REFERENCES: Bent 1968, Forbush 1929, Fretwell 1969.

Lapland Longspur

(Calcarius lapponicus)

A.O.U. No. 536.0





RANGE: Breeding: North of the tree line in Canada and Alaska. Winter: Winters s. to New Jersey, Colorado, and n. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Wintering: Cultivated fields, open weedy meadows, beaches, sandy waste places with sparse vegetation.

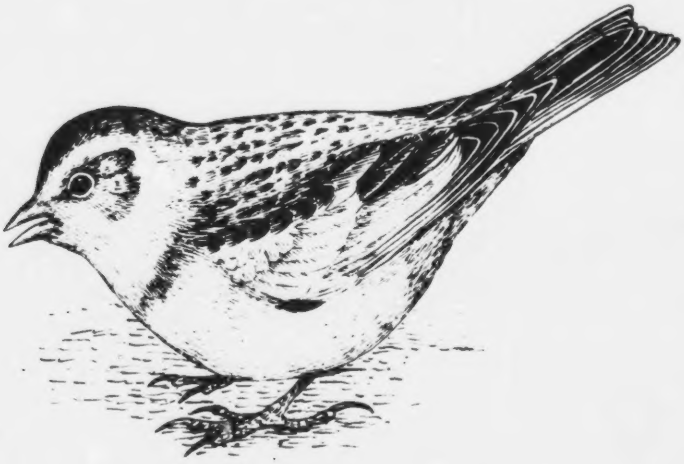
FORAGING: Major foods: Seeds of weeds and grasses. Substrates: Short grasses, bare earth. Techniques: Ground gleaning. Preferred feeding habitat: Stubble fields, coastal sandy areas where vegetation is sparse.

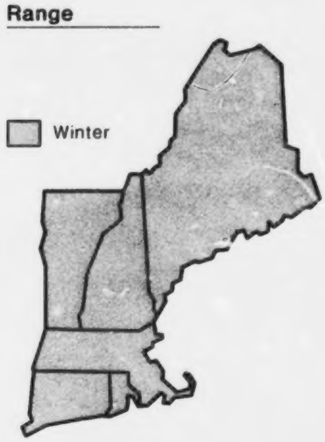
KEY REFERENCE: Bent 1968.

Snow Bunting

(Plectrophenax nivalis)

A.O.U. No. 534.0





RANGE: Breeding: Arctic regions of North America, s. to n. Quebec, c. Alaska. Winter: Central Quebec, w. to s. Alaska, s. to Virginia (coast), Pennsylvania, and Oregon.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Wintering: Lake shores, salt marshes, open beaches, cultivated fields and windswept grasslands.

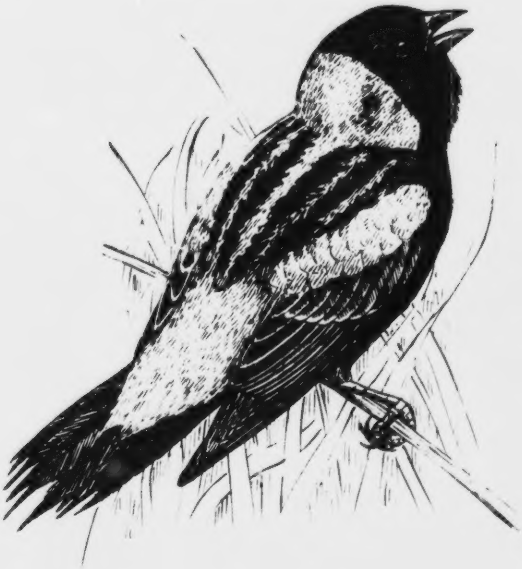
FORAGING: Major foods: Seeds of grasses, weeds, trees, especially alders and birches. Substrates: Surface of snow, tips of weeds and grasses. Technique: Ground gleaning. Preferred feeding habitat: Fields, farmyards, manure piles, ponds, beaches, frozen marshes, and meadows.

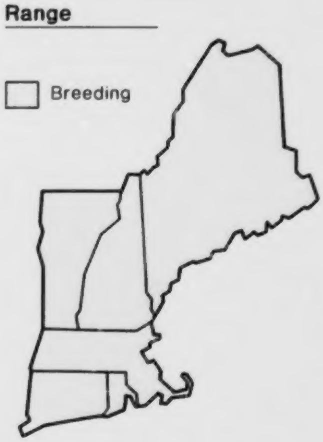
KEY REFERENCES: Bent 1968, Forbush 1929.

Bobolink

(Dolichonyx oryzivorus)

A.O.U. No. 494.0





RANGE: Breeding: Nova Scotia w. to British Columbia, s. to Pennsylvania and the coast of s. New Jersey (rarely), Indiana, Colorado, and nc. California. Winter: South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Breeding: Hayfields, meadows, marshes, fallow fields. May prefer moist lowlands to uplands.

SPECIAL HABITAT REQUIREMENTS: Large expanses of grassland or forb cover.

NESTING: Egg dates: May 18 to June 20, New York (Bull 1974:523). Clutch size: 4 to 7, typically 5 or 6. Incubation period: 13 days. Nestling period: 10 to 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: In dense vegetation, often hay, alfalfa, clover, or weeds usually in a slight hollow in ground. Occasionally nests are constructed above ground in weed stalks.

TERRITORY SIZE: 22 territories ranged from 2.7 to 12.1 acres (1.1 to 4.9 ha) (average 6.3 acres (2.6 ha)) in grasslands in Wisconsin (Wiens 1969:35).

SAMPLE DENSITIES: 9 territorial males per 80 acres (32.4 ha) in grasslands in Wisconsin (Wiens 1969:53). 100 pairs per square mile (39 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: Insects, weed and grass seeds; in New England, the summer diet consists of 70 to 90 percent insects that are replaced almost entirely by grain (90 percent) in September (Forbush 1929 V. 2:404). Substrates: Grasses, weeds. Techniques: Ground and herb gleaning. Preferred feeding habitat: Cultivated grain fields.

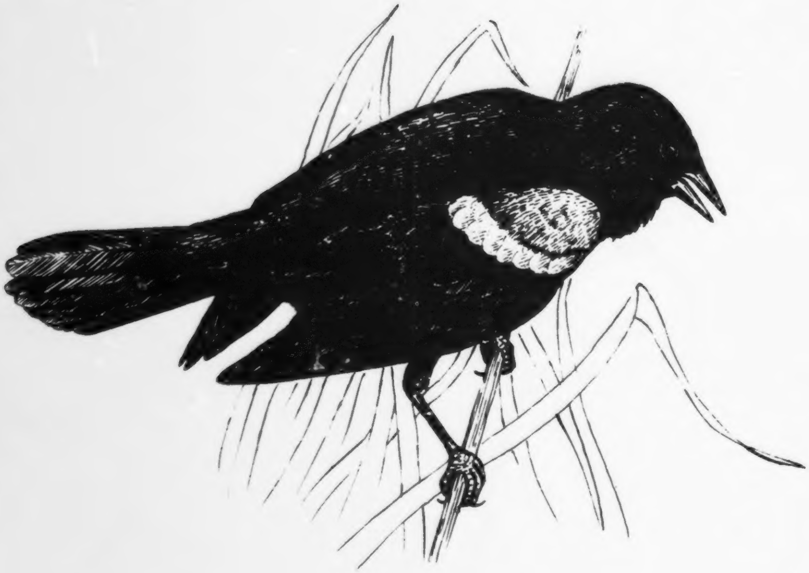
COMMENTS: Changes in haying practices (earlier cuttings) and the loss of agricultural land to development have contributed to the Bobolink's decline in the Northeast. Wiens (1969:41) found that Bobolinks in Wisconsin favored large open fields with dense ground vegetation.

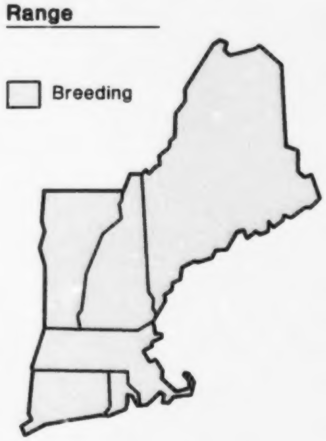
KEY REFERENCES: Bent 1958, Forbush 1929, Wiens 1969.

Red-winged Blackbird

(Agelaius phoeniceus)

A.O.U. No. 498.0





RANGE: Breeding: Nova Scotia w. to Alaska, s. to Florida and Mexico. Winter: New Jersey, e. Pennsylvania, Ohio, w. to British Columbia, s. to South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Breeding: Marshes, swamps, wet meadows, ponds, dry fields. Prefers wetlands with extensive growth of cattails, bulrushes, sedges, and reeds.

SPECIAL HABITAT REQUIREMENTS: Sites for night roosting close to food supply (Bird and Smith 1964).

NESTING: Egg dates: April 26 to July 9, New York (Bull 1974:526). Clutch size: 3 to 5, typically 3 or 4. Incubation period: 10 to 12 days. Nestling period: 10 to 11 days. Broods per year: 2 or 3. Age at sexual maturity: 1 or 2 years. Females — 1 year, males — probably 2 years (Harrison 1975:214). Nest height: 3 inches to 14 feet (7.6 cm to 4.3 m). Typically less than 6 feet (1.8 m). Nest site: In almost any kind of low herbaceous vegetation, shrub, or low tree. Usually near or above water but may be placed in dry sites.

TERRITORY SIZE: Average sizes ranged from 200 to 600 m^2 (0.05 to 0.15 acres) in bulrush with a little cattail in Washington (Holm 1973). Average size of 21 territories in cattail clumps surrounded by grassland was 2,512 square feet (233 m^2). Average size of 22 territories in main area of cattail marsh including central and peripheral territories was 10,653 square feet (990 m^2) (Orians 1961). 51 marsh territories averaged 0.17 acre (0.07 ha) (range 0.06 to 1.12 acres (0.02 to 0.5 ha)), upland territories averaged 0.54 acre (0.2 ha) (range 0.33 to 0.99 acres (0.07 to 0.4 ha)) (Case and Hewitt 1963).

SAMPLE DENSITIES: 16 pairs per 100 acres (40 ha) in marsh, 11 pairs per 100 acres (40 ha) in uplands (Case and Hewitt 1963). 164 pairs per square mile (63 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 73 territorial males per 100 acres (40 ha) in cattail marsh, 36 territorial males per 100 acres (40 ha) in shrubby field with stream-bordered trees (Stewart and Robbins 1958:322).

FORAGING: Major foods: Insects, weed seeds, grain. Substrates: Short grasses, freshly plowed earth. Technique: Ground gleaning. Preferred feeding habitat: Feeds up to 1 mile (1.6 km) from nest site in croplands, orchards, hayfields, and so on.

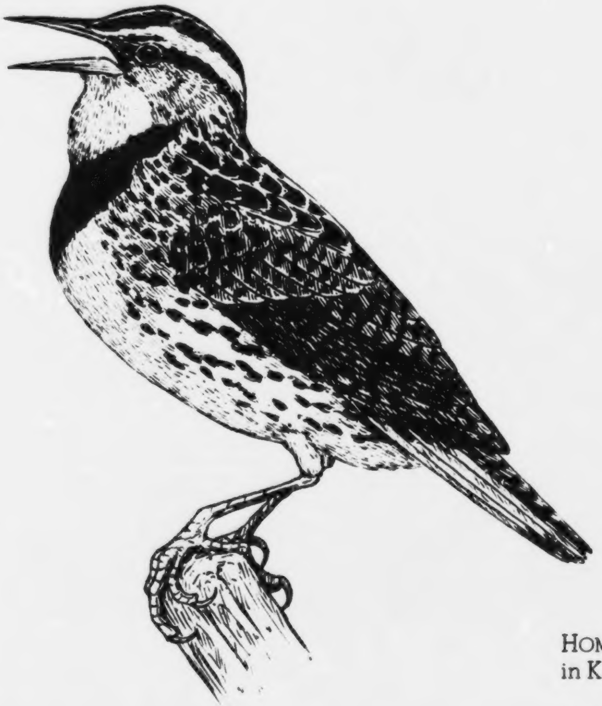
COMMENTS: The fall diet consists almost entirely of weed seeds.

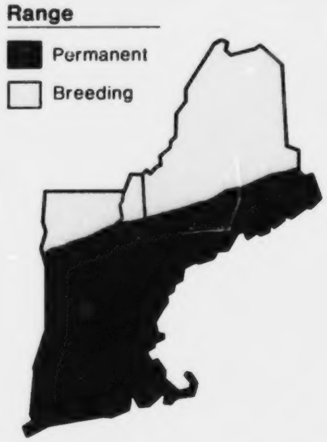
KEY REFERENCES: Bent 1958, Case and Hewitt 1963, Orians 1961.

Eastern Meadowlark

(Sturnella magna)

A.O.U. No. 501.0





RANGE: Breeding: New Brunswick, w. to c. Ontario, s. to Florida and n. Mexico. Winter: Central New England and New York, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Open farmlands, especially pastures, hayfields and grassy meadows. They may use areas with widely scattered shrubs and may favor moist lowlands.

SPECIAL HABITAT REQUIREMENTS: Grasslands, elevated singing perches.

NESTING: Egg dates: May 9 to August 4, New York (Bull 1974:524). Clutch size: 2 to 6, typically 3 to 5. Incubation period: 13 to 15 days. Nestling period: 10 to 12 days. Broods per year: 2. Age at sexual maturity: 1 year. Nest site: On ground in a natural depression or one scraped by female, sometimes partially or entirely roofed by nest materials and adjacent vegetation. Prefers to nest in cover 10 to 20 inches (25 to 50 cm) high.

TERRITORY SIZE: 3 to 15 acres (1.2 to 6.1 ha) in moist lowlands in Wisconsin (Lanyon 1957). 18 territories ranged from 4.3 to 7.9 acres (1.7 to 3.2 ha) (average 5.8 acres (2.3 ha)) in grasslands in Wisconsin (Wiens 1969:35).

HOME RANGE: 2.8 acres (1.1 ha) in a field of brome grass in Kansas (Fitch 1958).

SAMPLE DENSITIES: 20.9 nests per 100 acres (40 ha) in pasture, 12.6 nests per 100 acres (40 ha) in hayfield in Illinois. Ungrazed pasture had more nests than grazed pasture (Roseberry and Klimstra 1970). 12 territorial males per 80 acres (32.4 ha) in grasslands in Wisconsin (Wiens 1969:53).

FORAGING: Major foods: Insects, especiallly beetles and grasshoppers, weed seeds, grass seeds, waste grain seed. Substrates: Grasses and weeds. Techniques: Grass and ground gleaning.

COMMENTS: Winter food consists almost entirely of weed and grass seeds and waste grains. Wiens (1969:41) found that meadowlarks in Wisconsin favored large open fields.

KEY REFERENCES: Bent 1958, Lanyon 1957, Roseberry and Klimstra 1970.

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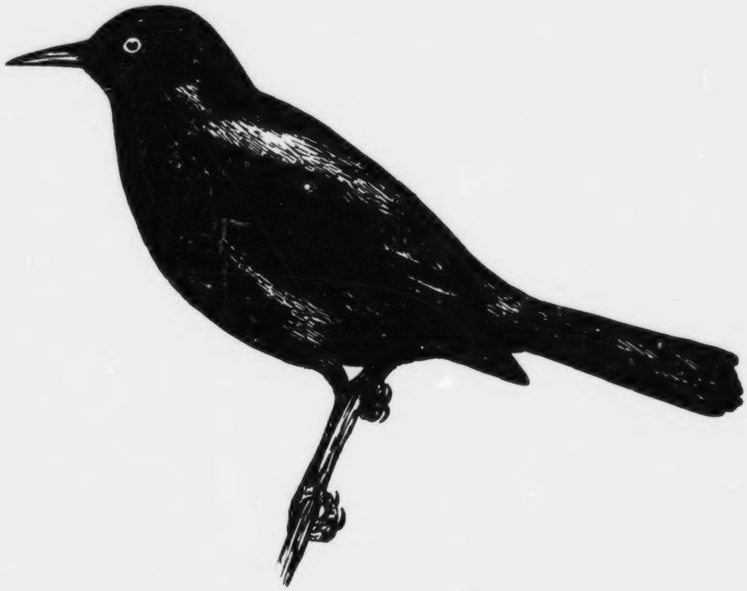
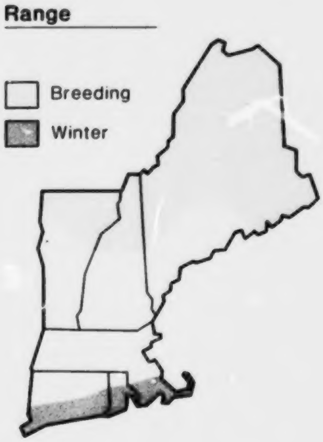
Rusty Blackbird

(Euphagus carolinus)

A.O.U. No. 509.0





RANGE: Breeding: Northern Quebec and s. Canadian Provinces, w. to Alaska, s. to n. New England and the Adirondack Mountains of New York. Winter: Southern New England, s. to Florida, Ohio River Valley, w. to Colorado, s. to Texas.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (northern Maine) to uncommon (northern Vermont) during breeding season. Rare and local (Connecticut, se. Massachusetts) in winter; more common southward.

HABITAT: Breeding: Wooded swamps, tree-bordered marshes, beaver ponds, muskegs, boreal bogs and stream borders with alder and willow thickets, wooded islands in lakes. Rarely seen in fields with other blackbirds. Wintering: Wooded swamps.

NESTING: Egg dates: May 7 to June 15, New York (Bull 1974:533). Clutch size: 4 to 5, typically 4 or 5. Incubation period: 14 days. Nestling period: About 13 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 2 to 20 feet (0.6 to 6.1 m), typically less than 10 feet (3.0 m). Nest site: Solitary nester. Nest is often in dense foliage of young conifers, especially balsam and spruce. Also builds in deciduous shrubs in marshes such as sweet gale and buttonbush.

TERRITORY SIZE: Breeding territories are sometimes large. Nests may be 0.5 mile (0.8 km) or more apart (Harrison 1975:217).

FORAGING: Major foods: Insects, seeds of weeds, grains, wild fruits from the remainder. Technique: Ground-gleaning. Preferred feeding habitat: Open areas, grassy edges of northern ponds and streams.

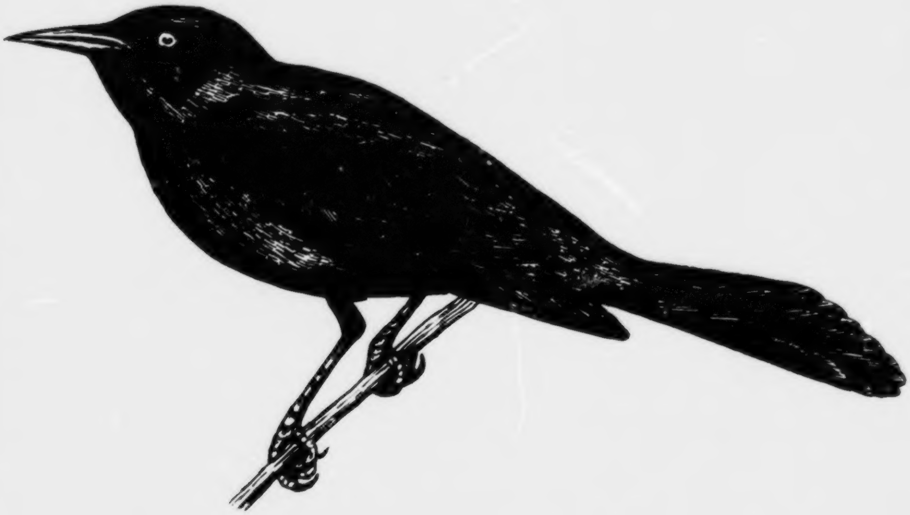
COMMENTS: The stomach contents of 132 birds taken in all months of the year except June and July contained 53 percent animal and 47 percent vegetable matter (Beal in Bent 1958:288).

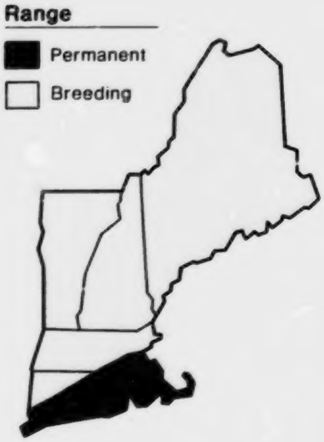
KEY REFERENCES: Bent 1958, Kennard 1920.

Common Grackle

(Quiscalus quiscula)

A.O.U. No. 511.0





RANGE: Breeding: Newfoundland, w. to the s. Canadian Rockies, s. to Florida, the Gulf Coast and Texas. Winter: Coastal sections of s. New England s. Ohio River Valley and Kansas, s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant in breeding season. Uncommon in winter.

HABITAT: Breeding: Farmlands, suburbs, marshes, swamps, meadows at low elevations. Uncommon in mountains. Wintering: Agricultural areas with or without open water and with some bare ground.

NESTING: Egg dates: April 12 to June 4, New York (Bull 1974:536). Clutch size: 3 to 6, typically 5. Incubation period: 11 to 12 days. Nestling period: About 18 to 20 days. Broods per year: Probably 1. Nest height: 1 to 60 feet (0.3 to 18.3 m). Typically 10 to 20 feet (3.0 to 6.1 m). Nest site: Solitary or colonial nesters. Usually nests in small colonies of 20 to 30 pairs. Prefers conifers but uses deciduous trees and shrubs. Less frequently nests in cavities, rock ledges, or cattails.

TERRITORY SIZE: Both male and female defend a small area surrounding nest (Ficken 1963).

HOME RANGE: Grackles range a mile or more from the nest site.

SAMPLE DENSITIES: 92 pairs per square mile (35 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: Ground-dwelling insects, fruits, mast, waste grains, small quantities of fish, crustaceans, amphibians, nesting birds and eggs. Substrates: Mud, cultivated earth, short grasses. Techniques: Ground gleaning, probing. Preferred feeding habitat: Open fields, shores of ponds, lawns.

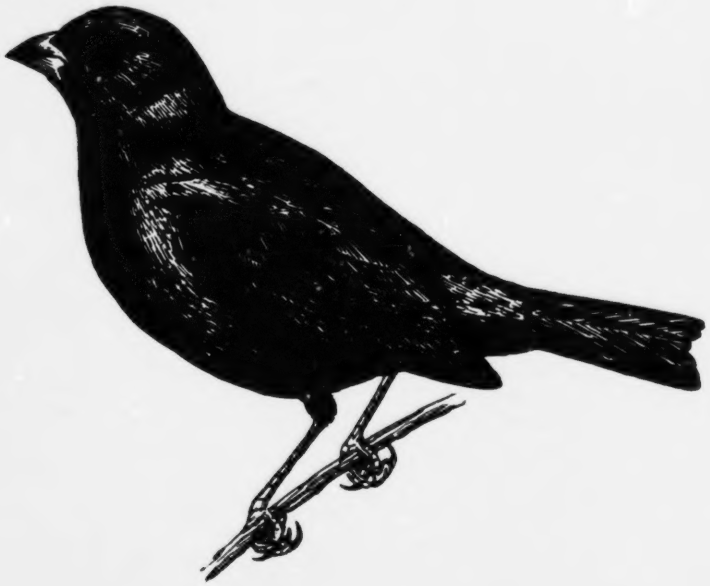
COMMENTS: Birds are highly gregarious in all seasons. Ornamental evergreens are commonly used for nesting. Maxwell and others (1976) found 24 percent of 2,601 nests located in redcedar. Records of Grackles using cavities and birdhouses indicates an ability to utilize marginal habitats.

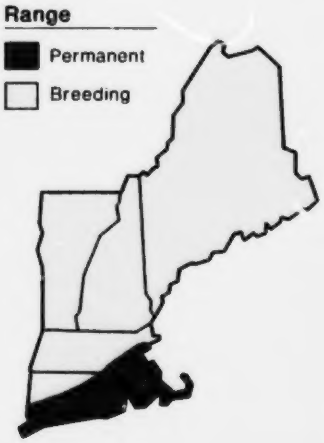
KEY REFERENCES: Bent 1958, Maxwell and Putnam 1972, Peterson and Young 1950.

Brown-headed Cowbird

(Molothrus ater)

A.O.U. No. 495.0





RANGE: Breeding: Nova Scotia, w. to British Columbia, s. to Virginia, Louisiana and Mexico. Winter: Coastal sections of Massachusetts, s. to c. Florida. Ohio River Valley, w. to n. California, s. to Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Open coniferous and deciduous woodlands, forest edges, agricultural land, suburban areas. Wintering: Agricultural lands, feeding stations.

NESTING: Egg dates: April 23 to July 31, New York (Bull 1974:539). Clutch size: 1 to 6, typically 3 (usually lays only one egg per nest). Broods per year: 3 or 4. Age at sexual maturity: 1 year. Nest height: To 80 feet (24.3 m). Nest site: Parasitic — builds no nest. Lays eggs in nests of other birds (214 species of which 121 have raised young cowbirds successfully). Song Sparrows and Yellow Warblers are most common hosts (Harrison 1975).

TERRITORY SIZE: Apparently does not defend an area but has a fixed breeding area in which female lays eggs (Friedmann 1929).

HOME RANGE: About 20 to 30 acres (8.1 to 12.1 ha) in floodplain habitat (open weedy fields with scattered trees) in Ohio (Nice 1937:154).

SAMPLE DENSITIES: 152 pairs per square mile (59 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: Seeds of weeds, grasses, grains, insects. Substrates: Short grasses, soft earth, weeds. Technique: Ground gleaning. Preferred feeding habitat: Grain fields, pastures where they often feed among cattle.

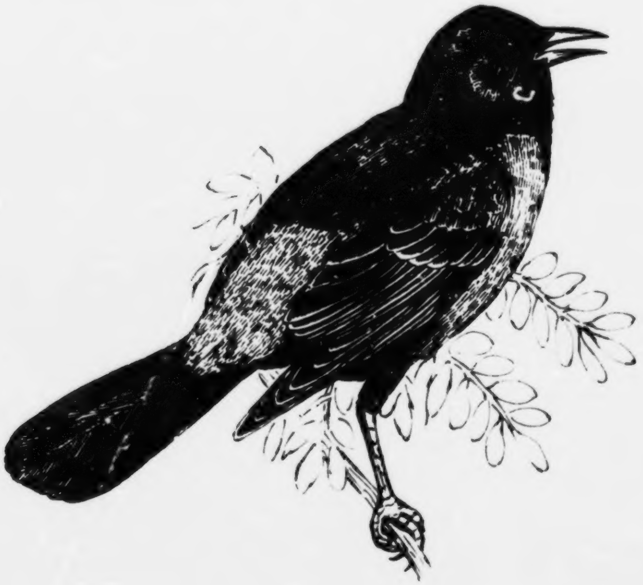
COMMENTS: The female lays an average of 10 to 12 eggs during the breeding season (range 1 to 15) (Payne 1965). Birds are often seen feeding in mixed flocks with Redwings or Common Grackles. Both sexes may flock in all seasons.

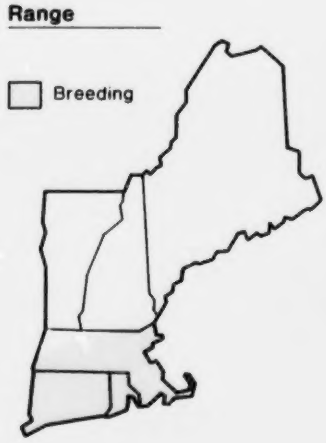
KEY REFERENCES: Friedmann 1929, Nice 1937, Payne 1965.

Orchard Oriole

(Icterus spurius)

A.O.U. No. 506.0





RANGE: Breeding: Eastern Massachusetts, w. to North Dakota, s. to the Gulf States. Winter: Mexico and n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Breeding: Orchards, woodland margins and open woodlands (avoids dense forest), shade trees along country roads and in suburbs. Prefers open, cultivated lands near human dwellings. Favors low elevations.

NESTING: Egg dates: May 18 to June 22, New York (Bull 1974:530). Clutch size: 3 to 7, typically 4 or 5. Incubation period: 12 to 14 days. Nestling period: 11 to 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 4 to 70 feet (1.2 to 21.3 m). Typically 10 to 20 feet (3.0 to 6.1 m). Nest site: Nest is suspended between two horizontally forked branches of a tree or shrub and is well concealed by dense foliage.

SAMPLE DENSITIES: Maryland — 29 territorial males per 100 acres (40 ha) in farmyards. 15 territorial males per 100 acres (40 ha) in suburban residential area. 10 territorial males per 100 acres (40 ha) in shrubby field with stream-bordered trees (Stewart and Robbins 1958:323).

FORAGING: Major foods: Insects represent more than 90 percent of diet, wild fruits form the remainder. Substrate: Leaf surfaces. Technique: Leaf gleaning.

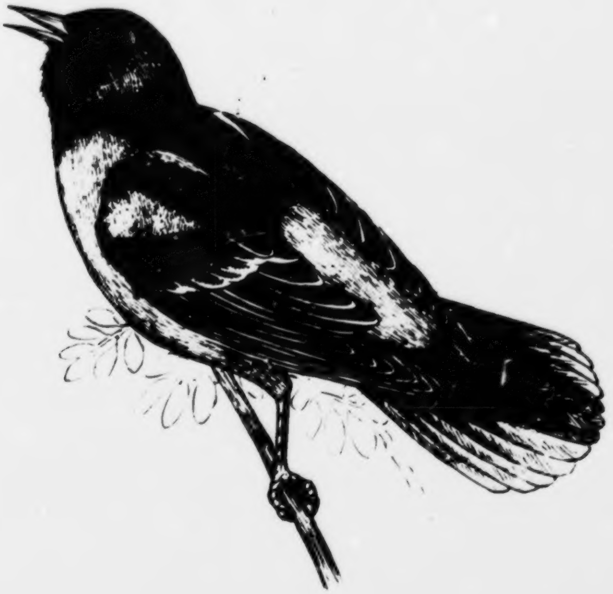
COMMENTS: Migrates south early (July-August). Stomachs of 11 birds taken in May and June in Maryland contained 91 percent animal and 9 percent vegetable material (Judd 1902 in Bent 1958:200).

KEY REFERENCES: Bent 1958, Dennis 1948.

Northern Oriole

(Icterus galbula)

A.O.U. No. 507.0



Range
☐ Breeding

RANGE: Breeding: Nova Scotia, w. to British Columbia, s. to Georgia, Mexico and s. California. Winter: Mexico to n. South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Suburban shade trees of lawns and roadsides, groves, orchards, parks, deciduous woodland edges and along streams and lakes. Wintering: Locally at feeding stations where fruits and suet are provided.

SPECIAL HABITAT REQUIREMENTS: Tall deciduous trees, prefers elms.

NESTING: Egg dates: May 15 to June 13, New York (Bull 1974:530). Clutch size: 4 to 6, typically 4 or 5. Incubation period: 12 to 14 days. Nestling period: 11 to 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 6 to 60 feet (1.8 to 18.3 m). Typically 25 to 30 feet (7.6 to 9.1 m). Nest site: Usually high in a deciduous tree, often elm maple, willow, or apple. Nest is deeply pendant and is usually attached by its rim to tip of drooping branch. Nests in maples — shallow basket placed toward top-center of crown.

SAMPLE DENSITIES: 20 pairs per square mile (8 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 10 territorial males per 100 acres (40 ha) in shrubby field with stream-bordered trees in Maryland (Stewart and Robbins 1958:324).

FORAGING: Major foods: Insects, fruit. Substrates: Leaf and twig surfaces. Techniques: Foliage and twig gleaning.

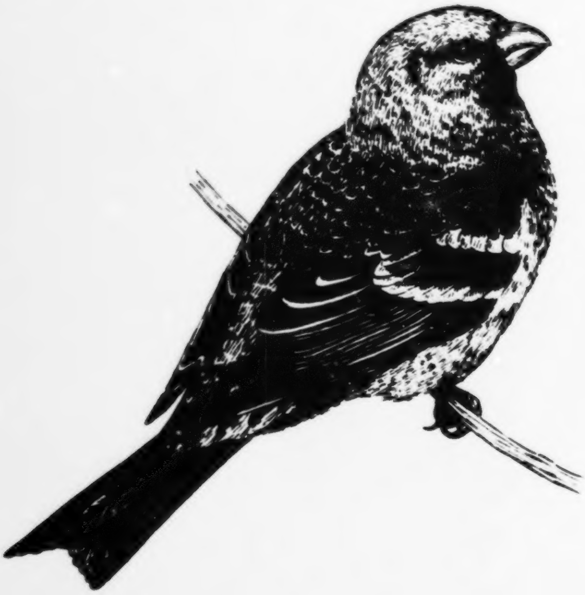
COMMENTS: The diet is mainly animal material (83 percent) and is supplemented by lesser amounts of vegetable material (17 percent), mostly fruits (Forbush 1913:226). Formerly Baltimore Oriole.

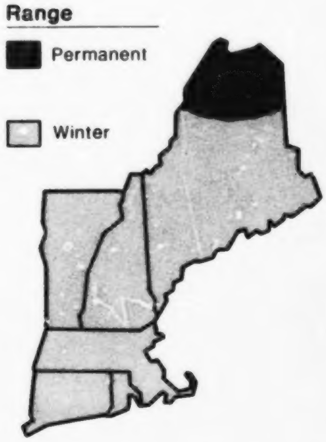
KEY REFERENCES: Bent 1958, Forbush 1929.

Pine Grosbeak

(Pinicola enucleator)

A.O.U. No. 515.0





RANGE: Breeding: Boreal forests of Canada, s. to Nova Scotia, n. New England, Manitoba, and the Rocky Mountains. Winter: Wanders s. irregularly to Maryland, Indiana, and Nebraska.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon and irregular.

HABITAT: Breeding: Northern spruce-fir forests, typically at high elevations, usually at edge of open area in forest or along forest border. Wintering: May remain in breeding areas or move south to open cedar-strewn hillsides, residential areas with feeders, orchards, street trees.

SPECIAL HABITAT REQUIREMENTS: Coniferous forests.

NESTING: Clutch size: 2 to 5, typically 4. Incubation period: 13 to 14 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest site: Low in coniferous tree (often spruce) or shrub.

FORAGING: Major foods: Buds, seeds, some insects in spring and summer. Substrates: Ground, branches. Techniques: Ground gleaning, budding.

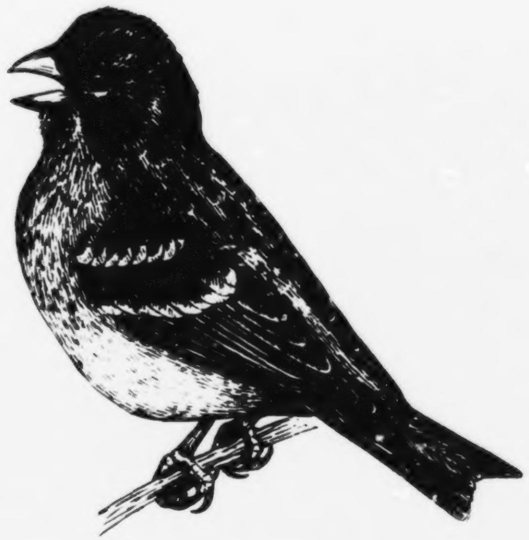
COMMENTS: Winter diet: 99.1 percent vegetable, 0.9 percent animal (365 stomachs). Summer diet: 84 percent vegetable, 16 percent animal (29 stomachs) (Gabrielson 1924 in Bent 1968:330).

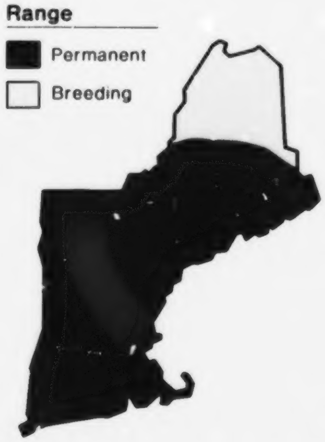
KEY REFERENCES: Bent 1968, Harrison 1975.

Purple Finch

(Carpodacus purpureus)

A.O.U. No. 517.0





RANGE: Breeding: Newfoundland, w. to British Columbia, s. to the mountains of Maryland, Illinois, and the mountains of California. Winter: Northern New England, w. to Wisconsin, s. to Georgia and Texas, British Columbia, s. to s. California and Arizona.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon (s. Connecticut).

HABITAT: Breeding: Edges of coniferous forests, evergreen plantations, ornamental conifers in residential areas, parks, open mixed woodlands. Wintering: Largely deciduous woodlands. Common at feeding stations.

SPECIAL HABITAT REQUIREMENTS: Coniferous trees.

NESTING: Egg dates: May 13 to July 16, New York (Bull 1974:556). Clutch size: 3 to 6, typically 4 or 5. Incubation period: 13 days. Broods per year: 1 or 2. Nest height: 5 to 60 feet (1.5 to 18.3 m). Nest site: Typically on horizontal branch of a conifer (commonly spruce), often near top of tree.

FORAGING: Major foods: Over 70 percent vegetable matter, especially seeds of conifers, weeds and grasses, buds, fruits. Also takes insects, spiders, and other small invertebrates. Substrates: Branches. Technique: Branch gleaning.

COMMENTS: Ornamental conifers and Christmas tree plantations have influenced the southward range expansion of this species (Harrison 1975:230).

KEY REFERENCES: Bent 1968, Pough 1949.

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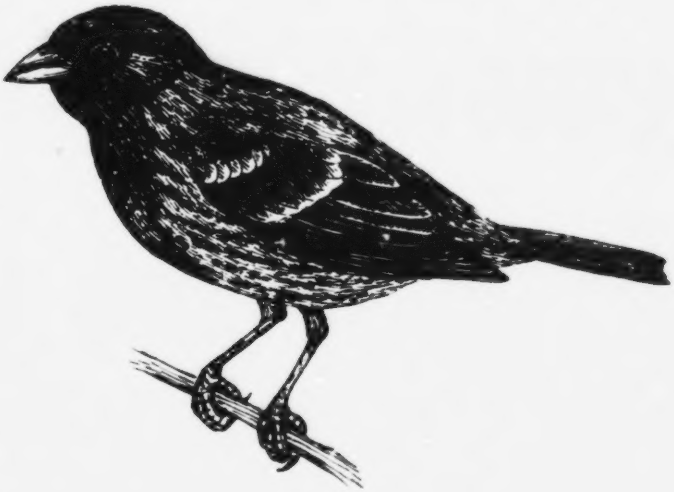
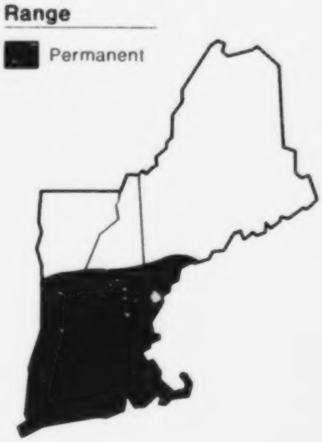
House Finch

(Carpodacus mexicanus)

A.O.U. No. 519.0





RANGE: Breeding: Introduced to New York City and spread to c. New England, Pennsylvania, New Jersey, Maryland, and Delaware. The western (native) range extends from British Columbia to s. Mexico. Winter: Same as breeding range.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (spreading rapidly northward throughout New England).

HABITAT: Breeding: Rural, suburban and urban yards, city parks, farms, open woods. Wintering: Same as breeding habitat.

SPECIAL HABITAT REQUIREMENTS: Birds may require open ground with low seed-producing plants and fruits and berries during part of year (Elliott and Arbib 1953).

NESTING: Egg dates: April 11 to July 20, New York (Bull 1974:560). Clutch size: 2 to 6, typically 4 or 5. Incubation period: 12 to 16 days. Nestling period: Average 15 days, range 11 to 19 days (Evenden 1957). Broods per year: 2 or more. Age at sexual maturity: 1 year. Nest height: 3 to 20 feet (0.9 to 6.1 m). Nest site: Uses a variety of sites including buildings, ledges, tree cavities, bird houses, vines (especially ivy) on buildings. In the Eastern United States, birds seem to be associated with conifers, especially cultivated varieties such as arbor-vitae and hedges (Elliott and Arbib 1953).

FORAGING: Major foods: Weed seeds, wild and cultivated fruit, insects. Substrates: Weeds and grasses. Technique: Ground gleaning.

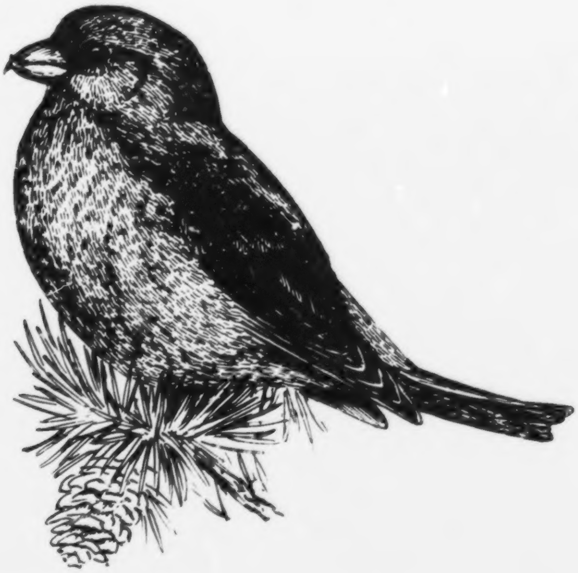
COMMENTS: The House Finch was introduced to the Northeast in the 1940's (New York City area) from California by illegal pet trade. Its range has expanded to include much of the Northeast. About 97 percent of diet of 1,206 stomachs was vegetable matter (Beal 1907 in Bent 1968:306).

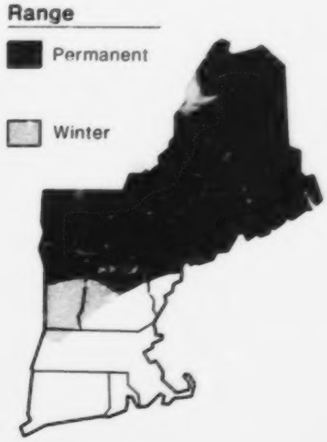
KEY REFERENCES: Bent 1968, Elliott and Arbib 1953, Evenden 1957, Harrison 1975.

Red Crossbill

(Loxia curvirostra)

A.O.U. No. 521.0





RANGE: Breeding: Newfoundland, w. to Alaska, s. to n. New England, n. Georgia (mountains), Minnesota and the western mountains s. to Central America. Winter: South to the Gulf Coast (irregularly).

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common (Maine — coastal islands) to rare (inland).

HABITAT: Breeding: Coniferous forests from wooded marine islands to mountain tops. Wintering: Coniferous woods.

SPECIAL HABITAT REQUIREMENTS: Coniferous trees.

NESTING: Egg dates: March 30 to April 30, New York (Bull 1974:566). Clutch size: 3 to 5, typically 4. Incubation period: 12 to 14 days. Nestling period: 15 to 17 days. Broods per year: 1. Age at sexual maturity: 1 year. Nest height: 5 to 80 feet (1.5 to 24.4 m). Typically 10 to 40 feet (3.0 to 12.2 m). Nest site: On horizontal branch of conifer, usually hidden in a tuft of needles, well out from trunk.

TERRITORY SIZE: Defends a small area around the nest (Lawrence 1949).

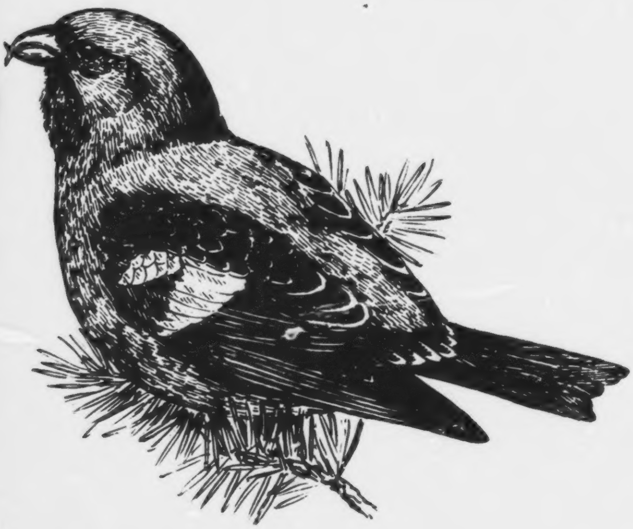
FORAGING: Major foods: Seeds of conifers, hardwoods, and annual weeds; buds, wild fruits. Substrates: Tips of branches of trees, ground, bunches of conifer needles. Techniques: Branch, twig, cone, and foliage gleaning.

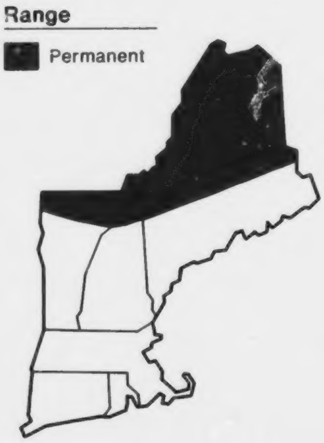
COMMENTS: Crossbills are attracted to highways in winter by road salt. Breeding periods are irregular with nesting reported in all months of the year; may be governed by food supply.

KEY REFERENCES: Bent 1968, Griscom 1937, Lawrence 1949.

White-winged Crossbill
(*Loxia leucoptera*)

A.O.U. No. 522.0





RANGE: Breeding: Coniferous forests of Canada, s. to n. New England, Minnesota, and British Columbia. Winter: Irregularly s. to North Carolina, Illinois, and n. Oregon.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Breeding: Coniferous forests. Wintering: Coniferous forests.

SPECIAL HABITAT REQUIREMENTS: Coniferous forests.

NESTING: Clutch size: 2 to 5. Nest site: Horizontal limb of spruce. Nest heights vary considerably with some reported in low spruce shrubs and others at tops of 70-foot (21-m) trees. Reportedly nests in pines and other conifers, though less frequently.

FORAGING: Major foods: Seeds of conifers, hardwood trees especially birch and alder; weed seeds, fruits, small amounts of insects. Substrates: Branches of evergreens, clumps of needles. Techniques: Extracting seeds from conifer cones.

COMMENTS: Breeding is erratic with nesting reported from January to December. Breeding habits are little known.

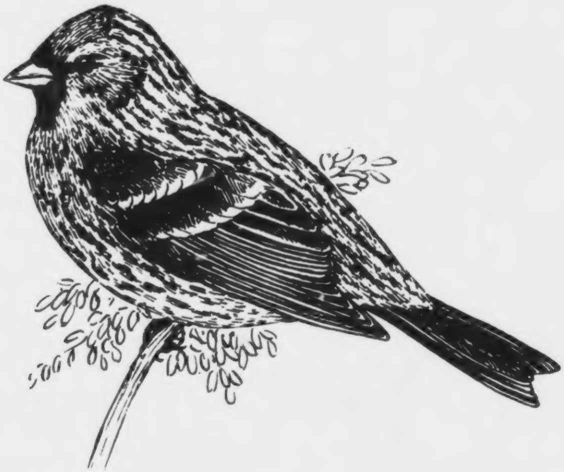
KEY REFERENCE: Bent 1968.

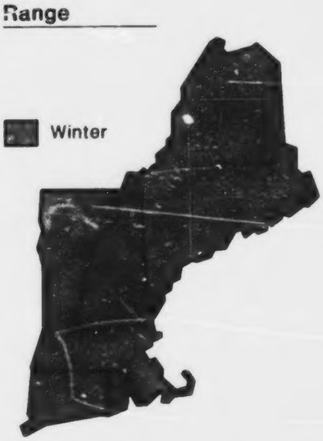
BEST COPY AVAILABLE

Common Redpoll

(Carduelis flammea)

A.O.U. No. 528.0





RANGE: Breeding: Southern Newfoundland, w. to n. British Columbia. Winter: Wanders s. to North Carolina, Colorado and n. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon and irregular.

HABITAT: Wintering: Near alders and birches, the seeds of which are an important winter staple. Snow-covered weedy fields.

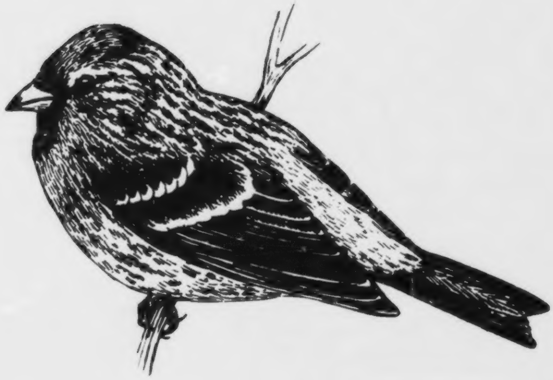
FORAGING: Major foods: Seeds of weeds, grasses, conifers, birches, and alders. Substrate: Ground. Techniques: Ground gleaning, opening seed heads.

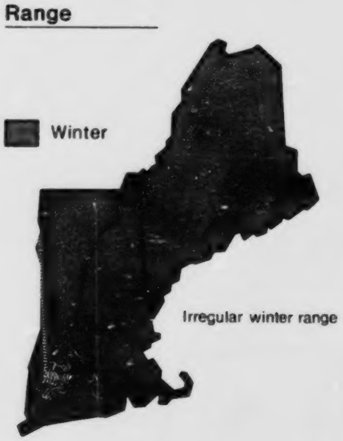
KEY REFERENCE: Bent 1968.

Hoary Redpoll

(Carduelis hornemanni)

A.O.U. No. 527.0





RANGE: Breeding: Northern Alaska to n. Quebec. Winter: Irregularly s. to n. border states.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare.

HABITAT: Old fields, pastures, and birch or alder swamps.

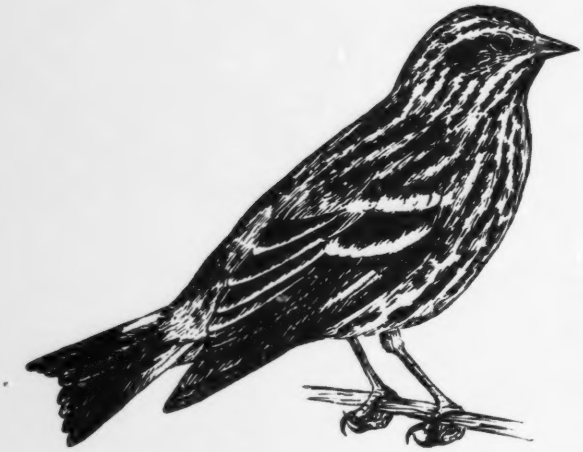
FORAGING: Major foods: Seeds of birches, alders and common grasses. Substrates: Ground. Techniques: Ground gleaning, opening seed heads.

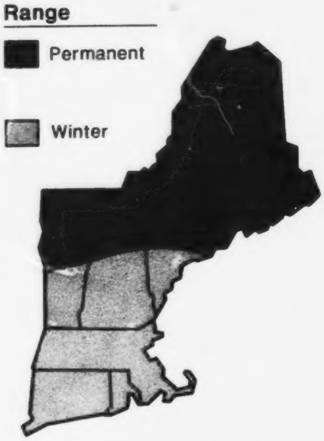
KEY REFERENCE: Forbush 1929.

Pine Siskin

(*Carduelis pinus*)

A.O.U. No. 533.0





RANGE: Breeding: Quebec, west to Alaska, south to n. New England, North Carolina (mountains). Occurs rarely and erratically in n. Pennsylvania, s. New York and s. New England. Winter: Breeding range south to Florida, the Gulf States and Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon in breeding season. Abundant to rare (very irregular) in winter.

HABITAT: Breeding: Coniferous forests, natural conifer stands or evergreen plantations, alder thickets, weed patches adjacent to forests.

SPECIAL HABITAT REQUIREMENTS: Conifers.

NESTING: Egg dates: April 25 to May 25, New York (Bull 1974:564). Clutch size: 2 to 6, typically 3 or 4. Incubation period: 13 days. Nestling period: About 15 days. Age at sexual maturity: 1 year. Nest height: 6 to 35 feet (1.8 to 10.7 m). Typically 20 feet (6.1 m). Nest site: Usually nests in loose colonies. Nest is usually on a horizontal branch of a conifer and well out from the trunk. Nests exclusively in conifers.

TERRITORY SIZE: Small area 3 to 6 feet (0.9 to 1.8 m) in diameter surrounding nest (Weaver and West 1943).

FORAGING: Major foods: Summer — Insects, buds, seeds, tender leaves. Winter — Seeds of annual weeds, conifers, birches, and alders. Substrates: Ground, cone-bearing branches, especially in tops of trees. Techniques: Ground gleaning, opening seed heads.

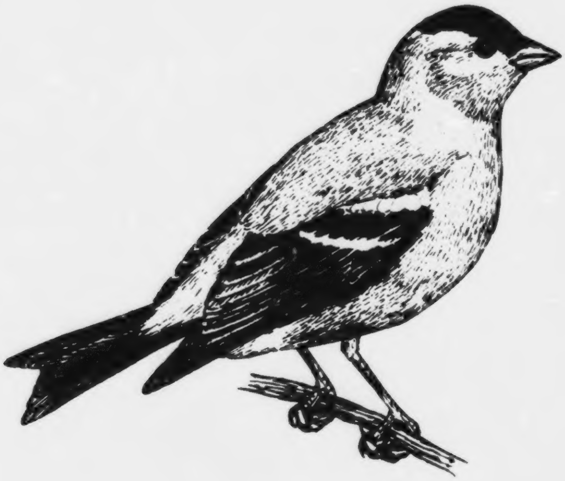
COMMENTS: Siskins usually breed at elevations of 3,000 feet (914 m) or more in New York, Vermont, and New Hampshire; lower in Maine. Birds feed in flocks in all seasons of the year. Numbers seem to fluctuate with cone crops.

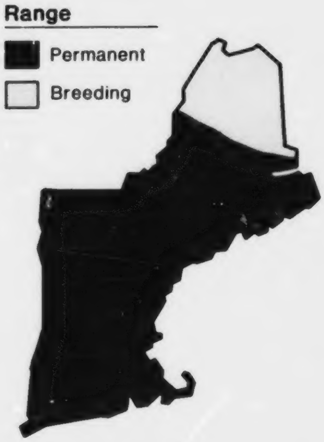
KEY REFERENCES: Bent 1968, Rodgers 1937, Weaver and West 1943.

American Goldfinch

(Carduelis tristis)

A.O.U. No. 529.0





RANGE: Breeding: Newfoundland, w. to British Columbia, s. to Georgia, Colorado, and s. California. Winter: Central Maine, s. to Florida, the Gulf States and Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeding: Open weedy fields, pastures with scattered trees near villages and farms, forest edges, open swamps. Wintering: Woodlands.

SPECIAL HABITAT REQUIREMENTS: Open weedy fields, scattered woody growth for nesting.

NESTING: Egg dates: July 3 to September 16, New York (Bull 1974:563). Clutch size: 4 to 6, typically 5. Incubation period: 12 to 14 days. Nestling period: 11 to 15 days. Broods per year: 1 or 2. Age at sexual maturity: 1 year. Nest height: 1 to 90 feet (0.3 to 27.4 m). Typically 4 to 40 feet (1.2 to 12.2 m). Nest site: Usually in a fork formed by 3 or 4 upright branches or on a horizontal limb of a tree.

TERRITORY SIZE: Goldfinches do not always show strong territorial behavior (Nickell 1951). Average territory size of 38 pairs was an area 95 feet (20 m) in diameter in a dry marsh in Wisconsin (Stokes 1950).

SAMPLE DENSITIES: 38 pairs per 6.4 acres (2.6 ha) of dry marsh in Wisconsin (Stokes 1950). 40 pairs per square mile (15 pairs per km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972). 21 territorial males per 100 acres (40 ha) in shrubby field with stream-bordered trees in Maryland (Stewart and Robbins 1958:345).

FORAGING: Major foods: Insects, buds, succulent vegetation (in summer); seeds of weeds, birches, alders, conifers (in winter). Substrates: Tips of weed stalks, fruit-bearing branches of trees and shrubs. Techniques: Ground, shrub and leaf gleaning, breaking open seed heads. Preferred feeding habitat: Feeding areas may be a mile or more from nest site (Drum 1939).

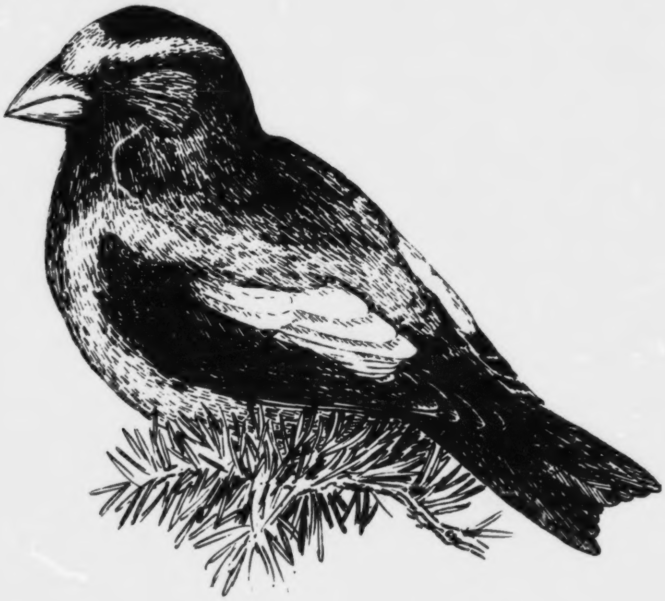
COMMENTS: Late nesting coincides with seed production of thistles. The Canada thistle and dandelion are important for food and nesting material (Nickell 1951).

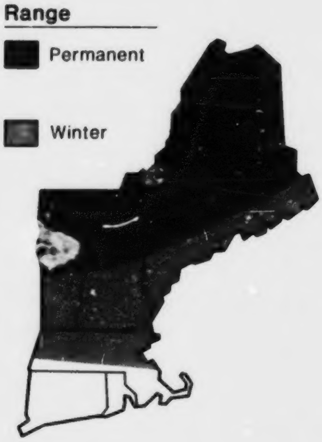
KEY REFERENCES: Bent 1968, Nickell 1951, Stokes 1950, Walkinshaw 1938a, 1939a.

Evening Grosbeak

(Coccothraustes vespertinus)

A.O.U. No. 514.0





RANGE: Breeding: Nova Scotia, w. to British Columbia, s. to n. New England, Minnesota, Mexico (mountains), and California. Winter: Breeding range s. to South Carolina, Texas, and California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common (Maine) to uncommon (Berkshire Hills) in breeding season. Irregularly common in winter.

HABITAT: Breeding: Coniferous forests. Wintering: Coniferous and deciduous woodlands.

SPECIAL HABITAT REQUIREMENTS: Coniferous forests.

NESTING: Egg dates: May 19 to June 4, New York (Bull 1974:553). Clutch size: 2 to 5, typically 3 or 4. Broods per year: Possibly 2 (Bull 1974:553). Nest height: 20 to 60 feet (6.1 to 18.3 m). Nest site: Usually in a conifer, occasionally in a deciduous tree.

FORAGING: Major foods: Buds, fruits, seeds, insects. Substrates: Branches of trees. Techniques: Branch gleaning, budding.

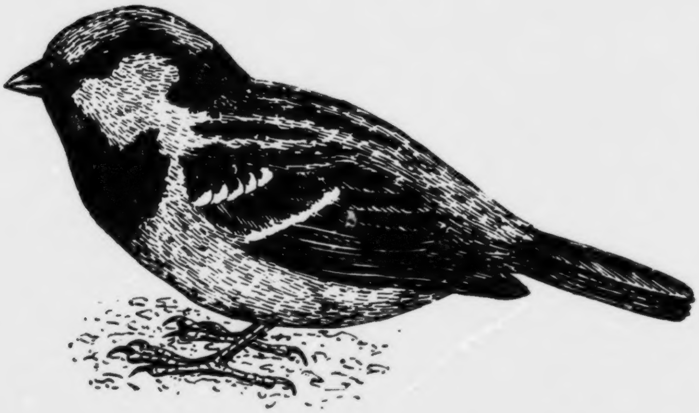
COMMENTS: Evening Grosbeaks feed extensively on spruce budworm during outbreaks in the northern forests. In winter they often invade feeding stations in large flocks to feed on sunflower seeds. Breeding habits are little known.

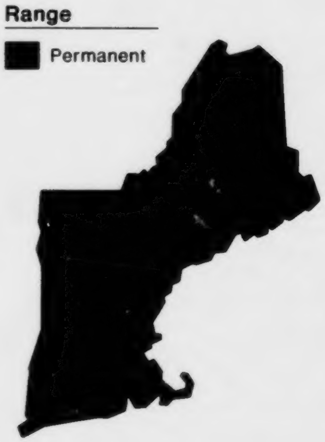
KEY REFERENCES: Belknap 1973, Bent 1968, Parks and Parks 1963.

House Sparrow

(Passer domesticus)

A.O.U. No. 688.2





RANGE: Breeding: Throughout inhabited portions of United States n. to c. Canada. Winter: Same.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Breeding: Villages, farms, cities, parks. Avoids heavily forested areas. Wintering: Same as breeding habitat.

NESTING: Egg dates: March 23 to July 16, New York (Bull 1974:542). Clutch size: 3 to 7, typically 5. Incubation period: 12 to 13 days. Nestling period: 13 to 18 days. Broods per year: 2 or 3. Age at sexual maturity: 1 year. Nest height: 10 to 50 feet (3.0 to 15.2 m). Nest site: Cavities, crevices in buildings, trees, billboards, bird houses, cupolas, rafters, dense ivy on buildings.

TERRITORY SIZE: Defense is limited to the nest site.

SAMPLE DENSITIES: C. A. North (1972) had 3.4 breeding pairs per acre (0.4 ha) on his 160-acre (64.8-ha) study area. 80 pairs per square mile (30 pairs/km^2) in favorable habitat in North Dakota (Stewart and Kantrud 1972).

FORAGING: Major foods: Insects, vegetables, fruits and seeds (summer), weed seeds and waste grains (winter), garbage. Substrates: Sparsely vegetated or bare earth, pavement. Techniques: Hopping and gleaning food from ground. Preferred feeding habitat: City parks, residential areas, waste grain fields.

COMMENTS: Birds are gregarious when feeding and roosting. The House Sparrow competes successfully for nesting cavities and often usurps them from more desirable species of birds. A pair that has bred usually keeps the same nest site for life. Exceptions occur where sites are plentiful.

KEY REFERENCES: North 1972, Summers-Smith 1958, Weaver 1942.

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Mammals

This section provides information on the life history, distribution, and habitat associations of terrestrial mammals in New England. Nomenclature follows the *Revised checklist of North American mammals north of Mexico, 1982* (Jones et al. 1982). This checklist is the standard reference used by the American Society of Mammalogists. Species are arranged in phylogenetic order

We have included the mountain lion (*Felis concolor*), which many consider to be extirpated from the Northeastern United States and adjacent Canada; however, many unconfirmed sightings and one confirmed track cast (R. Downing, personal communication) warrant its inclusion here. We have omitted the beach vole (*Microtus breweri*) which only inhabits Muskeget Island, Massachusetts.

The relationships of New England mammals to forest habitats are not understood as well as those of birds. For some species, life history and distribution data are lacking, particularly for bats and shrews. For such species, this compilation must be regarded as a starting point. From a habitat structure or classification standpoint, mammals have not been studied as thoroughly as have birds.

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SPECIES OCCURRENCE AND UTILIZATION, BY HABITAT
FORESTED

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Virginia Opossum *Didelphis virginiana*	Log or tree cavity.	B																●	●																											
			BF														●	●	●	●																											
			W																●	●							●	●																				
			WF														●	●	●	●																											
	Masked Shrew *Sorex cinereus*	Damp woodlands, ground cover.	B																																													
			BF																																													
			W																																													
			WF																																													
	Water Shrew *Sorex palustris*	Herbaceous cover, cold-water wetlands.	B																																													
			BF																																													
			W																																													
			WF																																													
	Smoky Shrew *Sorex fumeus*	Loose damp leaf litter.	B										●	●																																		
			BF										●	●																																		
			W										●	●																																		
			WF										●	●																																		
	Long-tailed Shrew *Sorex dispar*	Rocky, wooded sites.	B																																													
			BF																																													
			W																																													
			WF																																													
	Pygmy Shrew *Sorex hoyi*	Moist leaf mold near water.	B																																													
			BF																																													
			W																																													
			WF																																													
	Northern Short-tailed Shrew *Blarina brevicauda*	Low vegetation, damp, loose leaf litter.	B																																													
			BF																																													
			W																																													
			WF																																													
	Least Shrew *Cryptotis parva*	Loose soil.	B																																													
			BF																																													
			W																																													
			WF																																													
	Hairy-tailed Mole *Parascalops breweri*	Loose, moist, well-drained soil.	B																																													
			BF																																													
			W																																													
			WF																																													
	Eastern Mole *Scalopus aquaticus*	Soft, moist soils containing earthworms.	B																																													
			BF																																													
			W																																													
			WF																																													
	Star-nosed Mole *Condylura cristata*	Wet muck, humus.	B																																													
			BF																																													
			W																																													
			WF																																													

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce - Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Little Brown Myotis *Myotis lucifugus*	Females: dark, warm sites for maternity colonies. Forest openings for feeding.	B																																													
			BF																																													
			W																																													
			WF																																													
	Keen's Myotis *Myotis keenii*	Caves, mine shafts with temperatures near 40°F; high relative humidity and calm air.	B																																													
			BF																																													
			W																																													
			WF																																													
▲	Indiana Myotis *Myotis sodalis*	Caves for hibernation; cool, stable temperature of 40° to 46°F thru winter.	B																																													
			BF																																													
			W																																													
			WF																																													
	Small-footed Myotis *Myotis leibii*		B																																													
			BF																																													
			W																																													
			WF																																													
	Silver-haired Bat *Lasionycteris noctivagans*	Dead trees with loose bark or cavities; streams.	B																																													
			BF																																													
			*																																													
	Eastern Pipistrelle *Pipistrellus subflavus*	Warm, draft-free, damp sites for hibernation, open woods.	B																																													
			BF																																													
			W																																													
			WF																																													
	Big Brown Bat *Eptesicus fuscus*	Cold, dry areas of caves or buildings for hibernation.	B																																													
			BF																																													
			*																																													
	Red Bat *Lasiurus borealis*	Deciduous trees on forest edges for roosting.	B																																													
			BF																																													
			*																																													
	Hoary bat *Lasiurus cinereus*	Edges of coniferous forests.	B																																													
			BF																																													
			*																																													
	Eastern Cottontail *Sylvilagus floridanus*	Brush piles, stone walls, dens or burrows; herbaceous and shrubby cover.	B																																													
			BF																																													
			W	●				●				●																																		
			WF	●				●				●																																		
	New England Cottontail *Sylvilagus transitionalis*	Young woodlands with thick cover.	B																																													
			BF																																													
			W														●																															
			WF														●																															

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*See matrix for nonforested types.

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Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Snowshoe Hare *Lepus americanus*	Dense brushy or softwood cover.	B																																													
			BF																																													
			W																																													
			WF																																													
	European Hare *Lepus capensis*	Fields, meadows.	B																																													
			BF																																													
			W																																													
			WF																																													
	Eastern Chipmunk *Tamias striatus*	Forest edge or shrub cover, elevated perches, logs.	B																																													
			BF																																													
			W																																													
			WF																																													
	Woodchuck *Marmota monax*	Open land.	B																																													
			BF																																													
			W																																													
			WF																																													
	Gray Squirrel *Sciurus carolinensis*	Tall trees for dens or leafnests.	B																					●	●			●	●																			
			BF																					●	●			●	●																			
			W																					●	●			●	●																			
			WF																					●	●			●	●																			
	Red Squirrel *Tamiasciurus hudsonicus*	Woodlands with mature trees, conifers preferred.	B																													●	●			●	●			●	●			●	●			●	●
			BF																													●	●			●	●			●	●			●	●			●	●
			W																													●	●			●	●			●	●			●	●			●	●
			WF																													●	●			●	●			●	●			●	●			●	●
	Southern Flying Squirrel *Glaucomys volans*	Mature woodland with cavity trees; favors cavities with entrance diameters of 1.6 to 2 in.	B											●	●	●							●	●			●	●																			
			BF											●	●	●							●	●			●	●																			
			W											●	●	●							●	●			●	●																			
			WF											●	●	●							●	●			●	●																			
	Northern Flying Squirrel *Glaucomys sabrinus*	Mature trees, cavities for winter dens; arboreal lichens.	B											●	●	●											●	●											●	●								
			BF											●	●	●											●	●											●	●								
			W											●	●	●											●	●											●	●								
			WF											●	●	●											●	●											●	●								
	Beaver *Castor canadensis*	Woodland streams, lack of disturbance.	B																																													
			BF	●	●	●	●	●	●	●	●						●	●	●	●																												
			W																																													
			WF	●	●	●	●	●	●	●	●						●	●	●	●																												
	Deer Mouse *Peromyscus maniculatus*	Northern hardwoods or northern coniferous forests.	B																												●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			BF																										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			W																										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			WF																										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	White-footed Mouse ***Peromyscus leucopus***		B									●	●	●	●	●					●	●	●	●	●	●	●	●																				
			BF									●	●	●	●	●					●	●	●	●	●	●	●	●																				
			W									●	●	●	●	●					●	●	●	●	●	●	●	●																				
			WF									●	●	●	●	●					●	●	●	●	●	●	●	●																				

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Southern Red-backed Vole *Clethrionomys gapperi*	Springs, brooks, seeps, bogs: debris or slash cover.	B									●	●												●	●		
			BF									●	●												●	●		
			W									●	●												●	●		
			WF									●	●												●	●		
	Meadow Vole *Microtus pennsylvanicus*	Herbaceous vegetation, loose organic soils.	B																									
			BF																									
			W																									
			WF																									
	Rock Vole *Microtus chrotorrhinus*	Cool, moist, rocky woodlands with herbaceous ground cover and flowing water.	B																									
			BF																									
			W																									
			WF																									
	Woodland Vole *Microtus pinetorum*	Ground cover of leaves or grass; moist well-drained soils.	B																									
			BF																									
			W																									
			WF																									
	Southern Bog Lemming *Synaptomys cooperi*	Moist soils.	B																									
			BF																									
			W																									
			WF																									
	Northern Bog Lemming *Synaptomys borealis*	Moist to wet loose soils or leaf mulch.	B																									
			BF																									
			W																									
			WF																									
	Meadow Jumping Mouse *Zapus hudsonius*	Herbaceous groundcover, loose soils.	B																									
			BF																									
			W																									
			WF																									
	Woodland Jumping Mouse *Napaeozapus insignis*	Moist cool woodland, loose soils, herbaceous cover. No WF—hibernates	B						●	●	●		●	●	●	●		●	●	●								
			BF						●	●	●		●	●	●	●		●	●	●								
			W						●	●	●		●	●	●	●		●	●	●								
			WF																									
	Porcupine *Erethizon dorsatum*	Rock ledges or den trees.	B											●	●	●												
			BF									●	●	●	●	●												
			W											●	●	●												
			WF											●	●	●												
	Coyote *Canis latrans*		B																									
			BF																									
			W																									
			WF																									
	Red Fox *Vulpes vulpes*		B	●				●				●					●				●				●			
			BF	●				●				●					●				●				●			
			W	●				●				●					●				●				●			
			WF	●				●				●					●				●				●			

SPECIES	Seasonal use	Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
		S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
Southern Red-backed Vole *Clethrionomys gapperi*	B	●	●			●	●			●	●			●	●			●	●		
	BF	●	●			●	●			●	●			●	●			●	●		
	W	●	●			●	●			●	●			●	●			●	●		
	WF	●	●			●	●			●	●			●	●			●	●		
Meadow Vole *Microtus pennsylvanicus*	B																				
	BF																				
	W																				
	WF																				
Rock Vole *Microtus chrotorrhinus*	B																				
	BF																				
	W																				
	WF																				
Woodland Vole *Microtus pinetorum*	B																				
	BF																				
	W																				
	WF																				
Southern Bog Lemming *Synaptomys cooperi*	B																				
	BF																				
	W																				
	WF																				
Northern Bog Lemming *Synaptomys borealis*	B																				
	BF																				
	W																				
	WF																				
Meadow Jumping Mouse *Zapus hudsonius*	B																				
	BF																				
	W																				
	WF																				
Woodland Jumping Mouse *Napaeozapus insignis*	B																				
	BF																				
	W																				
	WF																				
Porcupine *Erethizon dorsatum*	B																			●	●
	BF									●	●	●	●	●	●	●	●	●	●	●	●
	W																			●	●
	WF																			●	●
Coyote *Canis latrans*	B																				
	BF																				
	W																				
	WF																				
Red Fox *Vulpes vulpes*	B	●				●				●				●				●			
	BF	●				●				●				●				●			
	W	●				●				●				●				●			
	WF	●				●				●				●				●			

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Gray Fox *Urocyon cinereoargenteus*	Hollow logs, tree cavities, rock crevices.	B										●	●	●	●		●	●	●		●	●	●		●	●	●																				
			BF										●	●	●	●		●	●	●		●	●	●		●	●	●																				
			W										●	●	●	●		●	●	●		●	●	●		●	●	●																				
			WF										●	●	●	●		●	●	●		●	●	●		●	●	●																				
	Black Bear *Ursus americanus*	Fallen trees, hollow logs, rock ledges, slash piles.	B												●					●				●				●																				
			BF									●			●		●			●	●		●	●	●		●	●																				
			W																																													
			WF																																													
	Raccoon *Procyon lotor*	Hollow trees, dens usually located 10 ft. or more above ground.	B																●	●																												
			BF														●	●	●	●																												
			W																●	●																												
			WF														●	●	●	●																												
	Marten *Martes americana*	Hollow trees, logs.	B																											●	●	●						●	●	●		●	●	●		●	●	●
			BF																											●	●	●						●	●	●		●	●	●		●	●	●
			W																											●	●	●						●	●	●		●	●	●		●	●	●
			WF																											●	●	●						●	●	●		●	●	●		●	●	●
	Fisher *Martes pennanti*	Hollow trees, logs.	B												●	●																														
			BF										●	●	●	●																														
			W												●	●																														
			WF										●	●	●	●																														
	Ermine *Mustela erminea*	Dense brushy cover, slash.	B																																													
			BF																																													
			W																																													
			WF																																													
	Long-tailed Weasel ***Mustela frenata***		B																																													
			BF																																													
			W																																													
			WF																																													
	Mink *Mustela vison*	Hollow logs, natural cavities, under tree roots, riparian habitat.	B														●	●	●	●																												
			BF														●	●	●	●																												
			W														●	●	●	●																												
			WF														●	●	●	●																												
	Striped Skunk *Mephitis mephitis*		B																																													
			BF																																													
			W																																													
			WF																																													
	River Otter *Lutra canadensis*	Body of water such as stream, pond, lake, river.	B																																													
			BF																																													
			W																																													
			WF																																													
▲	Mountain Lion *Felis concolor*	Seclusion; deer.	B																																													
			BF																																													
			W																																													
			WF																																													

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Aspen				Paper birch				Northern hardwoods					Red maple				Northern red oak				White pine—Northern red oak—Red maple				Balsam fir				Eastern white pine				Red spruce-Balsam fir				Red spruce				Eastern hemlock			
				S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	U	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L	S	Sp	St	L
	Lynx *Felis lynx*	Secluded den sites, extensive forests.	B																																													
			BF	●				●				●					●												●								●											
			W														●												●								●											
			WF	●				●				●					●												●								●											
	Bobcat *Felis rufus*	Rock ledges, under windfalls or in hollow logs.	B																																													
			BF																																													
			W																																													
			WF																																													
	White-tailed Deer *Odocoileus virginianus*	Softwood yarding cover in North.	B																																													
			BF	●				●				●																	●								●											
			W																																				●	●							●	●
			WF	●																																												
	Moose *Alces alces*	Wetlands (in summer).	B																																													
			BF														●	●											●								●											
			W														●	●																														
			WF														●	●																														
			B																																													
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SPECIES OCCURRENCE AND UTILIZATION, BY HABITAT NONFORESTED

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Virginia Opossum *Didelphis virginiana*	Hollow log or tree cavity.	B																			●								
			BF										●	●	●	●						●								
			W																											
			WF																											
	Masked Shrew *Sorex cinereus*	Damp woodlands, ground cover.	B														●													
			BF														●													
			W																											
			WF																											
	Water Shrew *Sorex palustris*	Herbaceous cover, cold water wetlands.	B										●	●	●	●	●	●	●	●	●									
			BF										●	●	●	●	●	●	●	●	●									
			W										●	●	●	●	●	●	●	●	●									
			WF										●	●	●	●	●	●	●	●	●									
	Smoky Shrew *Sorex fumeus*	Loose damp leaf litter.	B														●													
			BF														●													
			W														●													
			WF														●													
	Long-tailed Shrew *Sorex dispar*	Rocky, wooded sites.	B																											
			BF																											
			W																											
			WF																											
	Pygmy Shrew *Sorex hoyi*	Moist leafmold near water.	B																											
			BF																											
			W																											
			WF																											
	Northern short-tailed Shrew *Blarina brevicauda*	Low vegetation, damp, loose leaf litter.	B										●									●								
			BF										●									●								
			W										●									●								
			WF										●									●								
	Least Shrew *Cryptotis parva*	Loose soil.	B		●																									
			BF		●																									
			W		●																									
			WF		●																									
	Hairy-tailed Mole *Parascalops breweri*	Loose, moist, well-drained soil.	B																											
			BF																											
			W																											
			WF																											
	Eastern Mole *Scalopus aquaticus*	Soft, moist soils containing earthworms.	B					●																						
			BF					●																						
			W					●																						
			WF					●																						
	Star-nosed Mole *Condylura cristata*	Wet muck, humus.	B										●																	
			BF										●																	
			W										●																	
			WF										●																	

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Little Brown Myotis *Myotis lucifugus*	Females: dark, warm sites for maternity colonies.	B																										●	●
			BF											●	●	●	●	●	●	●	●	●								
			W																									●		
			WF																											
	Keen's Myotis *Myotis keenii*	Caves, mine shafts with temperatures near 40°F; high relative humidity and calm air.	B																									●	●	●
			BF											●	●	●	●	●	●	●	●	●								
			W																									●		
			WF																											
▲	Indiana Myotis *Myotis sodalis*	**Caves for hibernation; cool, stable temperature of 40° to 46° F through winter.**	B																									●		
			BF																											
			W																									●		
			WF																											
	Small-footed Myotis *Myotis leibii*		B																									●		●
			BF																											
			W																									●		
			WF																											
	Silver-haired Bat *Lasionycteris noctivagans*	Dead trees with loose bark or cavities; streams.	B																										●	●
			BF											●	●	●	●	●	●	●	●	●								
			W																											
			WF																											
	Eastern Pipistrelle *Pipistrellus subflavus*	Warm, draft-free, damp sites for hibernation, open woods.	B																								●	●	●	●
			BF											●	●	●	●	●	●	●	●	●								
			W																									●		
			WF																											
	Big Brown Bat *Eptesicus fuscus*	Cold, dry areas of caves or buildings for hibernation.	B																										●	●
			BF											●	●	●	●	●	●	●	●	●								
			W																									●		
			WF																											
	Red Bat *Lasiurus borealis*	Deciduous trees on forest edges for roosting.	B																											
			BF																											
			W																											
			WF																											
	Hoary Bat *Lasiurus cinereus*	Edges of coniferous forests.	B																											
			BF																											
			W																											
			WF																											
	Eastern Cottontail *Sylvilagus floridanus*	Brush piles, stone walls, dens or burrows; herbaceous and shrubby cover.	B		●	●	●	●	●	●			●	●		●														
			BF		●	●	●	●	●	●			●	●		●														
			W				●																							
			WF				●																							
	New England Cottontail *Sylvilagus transitionalis*	Young woodlands with thick cover.	B				●									●														
			BF				●									●														
			W													●														
			WF													●														

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Snowshoe Hare *Lepus americanus*	Dense brushy or softwood cover.	B				●									●	●													
			BF				●									●	●													
			W								●																			
			WF								●																			
	European Hare *Lepus capensis*	Fields, meadows.	B	●																										
			BF	●																										
			W	●																										
			WF	●																										
	Eastern Chipmunk *Tamias striatus*	Tree or shrub cover, elevated perches, logs.	B																											
			BF																											
			W																											
			WF																											
	Woodchuck *Marmota monax*	Open or semi-open country.	B	●	●	●		●	●	●																●				●
			BF	●	●	●		●	●	●																●				
			W	●	●	●		●	●	●																●				●
			WF																											
	Gray Squirrel *Sciurus carolinensis*	Tall trees for dens or leafnests.	B																											
			BF																											
			W																											
			WF																											
	Red Squirrel *Tamiasciurus hudsonicus*	Woodlands with mature trees, conifers preferred.	B																											
			BF																											
			W																											
			WF																											
	Southern Flying Squirrel *Glaucomys volans*	Mature woodland with cavity trees; favors cavities with entrance diameters of 1.6 to 2 in.	B																											
			BF																											
			W																											
			WF																											
	Northern Flying Squirrel *Glaucomys sabrinus*	Mature trees, cavities for winter dens; arboreal lichens.	B																											
			BF																											
			W																											
			WF																											
	Beaver *Castor canadensis*	Woodland streams, lack of disturbance.	B															●	●	●	●	●								
			BF															●	●	●	●	●								
			W															●	●	●	●	●								
			WF															●	●	●	●	●								
	Deer Mouse *Peromyscus maniculatus*	Northern hardwoods or northern coniferous forests.	B																										●	●
			BF																										●	●
			W																										●	●
			WF																										●	●
	White-footed Mouse *Peromyscus leucopus*		B				●																							●
			BF				●																							●
			W				●																							●
			WF				●																							●

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Southern Red-backed Vole *Clethrionomys gapperi*	Springs, brooks, seeps, bogs; debris or slash cover.	B																											
			BF																											
			W																											
			WF																											
	Meadow Vole *Microtus pennsylvanicus*	Herbaceous vegetation, loose organic soils.	B		●	●		●		●																				
			BF		●	●		●		●																				
			W		●	●		●		●																				
			WF		●	●		●		●																				
	Rock Vole *Microtus chrotorrhinus*	Cool, moist, rocky woodlands with herbaceous ground cover and flowing water.	B								●																			
			BF								●																			
			W								●																			
			WF								●																			
	Woodland Vole *Microtus pinetorum*	Ground cover of leaves or grass; moist to well-drained soils.	B		●					●																				
			BF		●					●																				
			W		●					●																				
			WF		●					●																				
	Muskrat *Ondatra zibethicus*	Wetlands with dense emergent vegetation; stable water level.	B											●	●															
			BF											●	●															
			W											●	●															
			WF											●	●															
	Southern Bog Lemming *Synaptomys cooperi*	Moist soils.	B										●	●																
			BF										●	●																
			W										●	●																
			WF										●	●																
	Northern Bog Lemming *Synaptomys borealis*	Moist to wet loose soils or leaf mulch.	B										●				●													
			BF										●				●													
			W										●				●													
			WF										●				●													
	Norway Rat *Rattus norvegicus*	Buildings, dumps or loose soil for digging burrows.	B																										●	
			BF																										●	
			W																										●	
			WF																										●	
	House Mouse *Mus musculus*	Buildings in winter.	B																										●	●
			BF																										●	●
			W																										●	●
			WF																										●	●
	Meadow Jumping Mouse *Zapus hudsonius*	Herbaceous groundcover, loose soils.	B		●								●	●																
			BF		●								●	●																
			W		●																									
			WF																											
	Woodland Jumping Mouse *Napaeozapus insignis*	Moist cool woodland, loose soils, herbaceous cover.	B				●																							
			BF				●																							
			W				●																							
			WF																											

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Porcupine *Erethizon oorsatum*	Rock ledges or den trees.	B																								●	●		
			BF																											
			W																											
			WF																											
	Coyote *Canis latrans*		B																							●				
			BF																											
			W																							●				
			WF																											
	Red Fox *Vulpes vulpes*		B																							●				
			BF		●																									
			W																							●				
			WF	●	●																									
	Gray Fox *Urocyon cinereoargenteus*	Hollow logs, tree cavities, rock crevices.	B																							●				
			BF																											
			W																							●				
			WF																											
	Black Bear ***Ursus americanus***	Fallen trees, hollow logs, rock ledges, slash piles.	B																											
			BF							●																				
			W																											
			WF																											
	Raccoon *Procyon lotor*	Hollow trees, dens usually located 10 ft. or more above ground.	B																											
			BF	●										●	●	●	●					●								
			W																											
			WF																											
	Marten *Martes americana*	Hollow trees, logs.	B																											
			BF																											
			W																											
			WF																											
	Fisher *Martes pennanti*	Hollow trees, logs.	B																											
			BF																											
			W																											
			WF																											
	Ermine *Mustela erminea*	Dense brushy cover, slash.	B				●																							
			BF				●																							
			W				●																							
			WF				●																							
	Long-tailed Weasel *Mustela frenata*		B																			●								
			BF																			●								
			W																			●								
			WF																			●								
	Mink *Mustela vison*	Hollow logs, natural cavities, under tree roots, riparian habitat.	B											●	●			●	●	●	●	●								
			BF											●	●			●	●	●	●	●								
			W											●	●			●	●	●	●	●								
			WF											●	●			●	●	●	●	●								

Local occurrence	SPECIES	Special habitat needs	Seasonal use	Terrestrial									Wetland/Deep Water													Other				
				Upland field									Palustrine							Riverine				Marine						
				Cultivated	Grass	Forb	Shrub/old field	Pasture	Savanna	Orchard	Krummholz	Alpine	Sedge meadow	Shallow marsh	Deep marsh	Shrub swamp	Bog	Pond	Lake	Stream	River	Riparian	Estuary/salt marsh	Coastal beach/rocks	Bay, ocean	Stable bank	Ledge, cliff	Cave	Structure, building	Derelict building, debris
	Striped Skunk *Mephitis mephitis*		B																											
			BF	●																										
			W				●																							
			WF																											
	River Otter *Lutra canadensis*	Body of water such as stream, pond lake, river.	B																●	●	●	●								
			BF																●	●	●	●								
			W																●	●	●	●								
			WF																●	●	●	●								
▲	Mountain Lion *Felis concolor*	Seclusion; deer.	B																											
			BF																											
			W																											
			WF																											
	Lynx *Felis lynx*	Secluded den sites, extensive forests.	B																											
			BF													●														
			W								●					●														
			WF								●					●														
	Bobcat *Felis rufus*	Rock ledges, under windfalls or in hollow logs.	B																											
			BF																											
			W																											
			WF																											
	White-tailed Deer *Odocoileus virginianus*	Softwood yarding cover in North.	B																											
			BF																											
			W																											
			WF																											
	Moose *Alces alces*	Wetlands (in summer).	B																											
			BF												●			●	●	●	●	●								
			W								●																			
			WF								●																			
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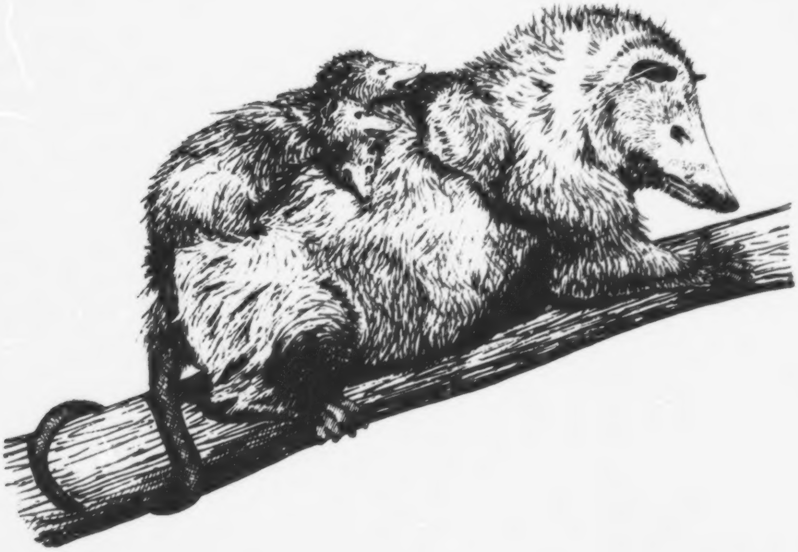
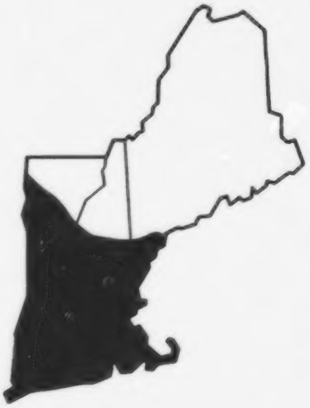
Virginia Opossum

(Didelphis virginiana)





RANGE: Throughout the Eastern United States except n. New England. Also occurs along the West Coast as a result of transplants and in parts of Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Dry to wet wooded areas; commonly found in wet woods near rivers and swamps, less often in wooded uplands or cultivated fields. Common near human habitation where they are attracted to garbage.

SPECIAL HABITAT REQUIREMENTS: Den—usually in abandoned burrow, tree cavity, hollow log, or brush pile; water (Llewellyn and Dale 1964).

REPRODUCTION: Age at sexual maturity: 8 to 12 months. Breeding period: Late January to early July, New York (Hamilton 1958). Gestation period: 13 days (Lay 1942). Young born: February to July in extremely undeveloped stage and remain in female's pouch for 60 days. Litter size: 5 to 13, average 8. Litters per year: 1 per year in north, 2 or 3 per year in south (Walker 1975:24).

HOME RANGE: Not territorial; separate home ranges not maintained. Average minimum range was 11.5 acres (4.7 ha). Range 0.33 to 58 acres (0.1 to 23.5 ha) for 29 opossums in East Texas (Lay 1942). 15 to 40 acres (6 to 16 ha) (Burt and Grossenheider 1976:1). Average minimum length of 25 elongate ranges in several habitats in Maryland was 0.6 mile (1 km) (Llewellyn and Dale 1964).

FOOD HABITS: Insects, worms, fruits, nuts, carrion, and garbage; almost any vegetable or animal food (Lay 1942). Also preys on voles, shrews, and moles (Hamilton 1951, Taube 1947).

COMMENTS: In winter, opossums become less active but do not hibernate (McManus 1971). Individuals in the north are often lacking ears and tails due to frostbite. Avoids predators by feigning death and voiding noxious odors (Francq 1969).

KEY REFERENCES: Hamilton 1958, Hartman 1953, Lay 1942, Llewellyn and Dale 1964, McManus 1974, Wiseman and Hendrickson 1950.

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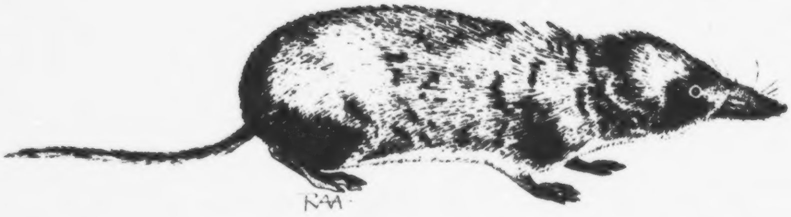
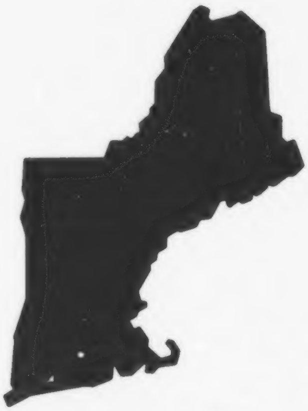
Masked Shrew

(Sorex cinereus)





RANGE: Throughout Canada and Alaska s. to North Carolina, New Mexico (mountains), and c. Washington.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Damp deciduous and coniferous woodlands with grasses, rocks, logs, or stumps for cover; bogs and other moist areas. Less often in open country with abundant moisture or in dry woods. Kirkland (1977b) found them in clearcuts in West Virginia.

SPECIAL HABITAT REQUIREMENTS: High humidity (moist sites) (Banfield 1974:9), ground cover (especially leaves, rotten logs, herbaceous vegetation).

REPRODUCTION: Age at sexual maturity: 20 to 26 weeks (Short 1961). Breeding period: Late April to late September or October (Banfield 1974:9). Gestation period: Probably 18 days (Godin 1977:24. Peterson 1966:36). Young born: Late April to September or October. Litter size: 2 to 10, average 4.4 (Banfield 1974:9). Litters per year: Up to 3 may be produced in a single season.

HOME RANGE: About 0.10 acre (0.04 ha) (Banfield 1974:9).

SAMPLE DENSITIES: Densities of up to 9 individuals per acre (22/ha) have been reported in favorable habitats (Banfield 1974:9).

FOOD HABITS: Mainly insectivorous and carnivorous. Also consumes worms, spiders, snails, slugs, and small amounts of vegetable matter. Feeds among litter on forest floor.

COMMENTS: Young are independent when about 1 month old (Godin 1977:24). Nests in grass, or under logs, rocks, or brush. Active throughout winter.

KEY REFERENCES: Banfield 1974, Walker 1975, Wrigley et al. 1979.

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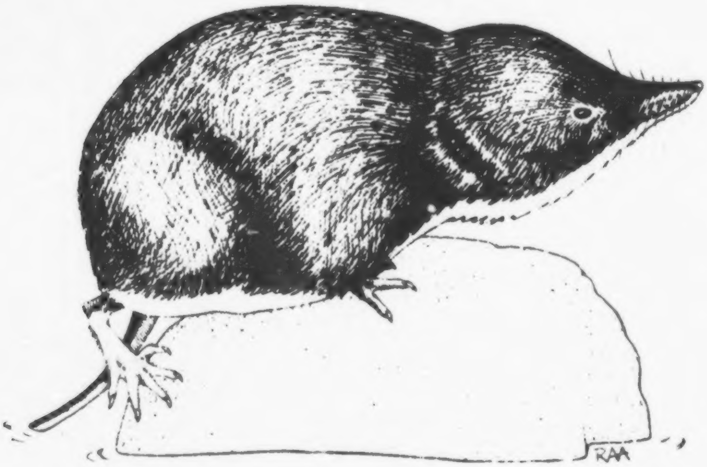
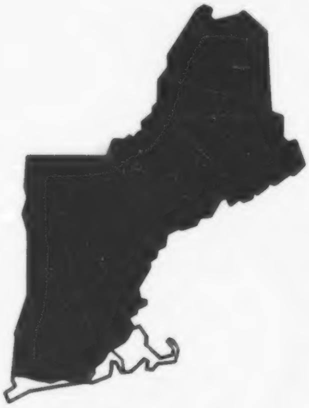
Water Shrew

(Sorex palustris)





RANGE: Nova Scotia and s. Quebec w. to British Columbia, s. through New England, much of New York, Pennsylvania, and the s. Appalachians. Also occurs in the mountains of the West.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncomon.

HABITAT: Wet areas, especially grass-sedge marsh or shrub zones along ponds and streams in coniferous forest (Wrigley et al. 1979). Also at wooded shores with favorable cover in the form of crevices beneath boulders, tree roots, or overhanging banks.

SPECIAL HABITAT REQUIREMENTS: Herbaceous cover, body of cold water (bog, stream, lake, and so on).

REPRODUCTION: Age at sexual maturity: Possibly 9 months. Breeding period: Possibly February to August. Peak: Possibly March to July. Gestation period: Probably about 21 days (Conaway 1952). Young born: Probably March to August. Litter size: 4 to 8, average 6. Litters per year: Possibly 2 to 3 are produced each year by mature females (Banfield 1974:14).

HOME RANGE: 0.5 and 0.8 acres (0.2 and 0.3 ha) for two individuals live-trapped in Manitoba (Buckner and Ray 1968).

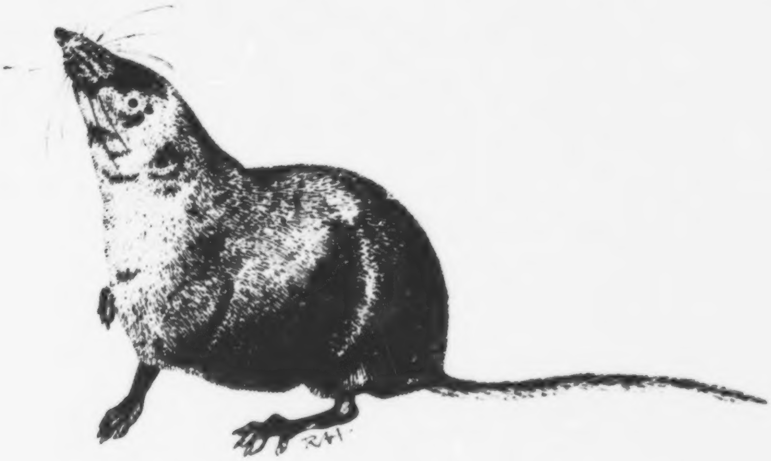
FOOD HABITS: Insectivorous—mainly eats larvae of aquatic insects. Also takes snails, flatworms, and small fish (Banfield 1974:14).

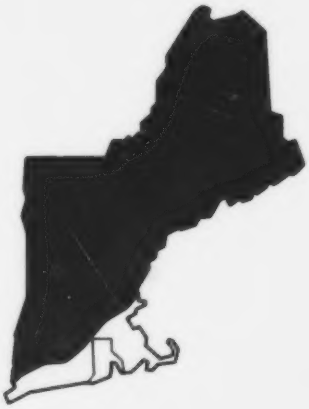
COMMENTS: Little is known about the habits of this species. Have been found more than 100 m from streams in mature northern hardwood stands in northern New Hampshire (D. Rudis, personal observation).

KEY REFERENCES: Banfield 1974, Conaway 1952, Wrigley et al. 1979.

Smoky Shrew

(Sorex fumeus)





RANGE: Maritime Provinces, s. Quebec and Ontario w. to Lake Superior. Southern Maine s. through parts of s. New England, Ohio, Kentucky, and Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Damp, boulder-strewn, upland woods (often beech or maple, birch and hemlock) with thick leafmold. Typically near streams with moss-covered banks (Burt and Grossenheider 1976:5, Godin 1977:27). Also uses early clearcuts in coniferous woodlands (Kirkland 1977b).

SPECIAL HABITAT REQUIREMENTS: Loose damp leaf litter—does not burrow, uses runways of other small mammals (Banfield 1974:16) in shady wooded areas (Peterson 1966:38).

REPRODUCTION: Age at sexual maturity: Spring following first winter. Breeding period: Late March to early August (New York Godin 1977:27). Gestation period: About 20 days (Hamilton 1940). Young born: Mid-April through August (New York) (Hamilton 1940). Litters per year: Up to 3 (Hamilton 1940).

SAMPLE DENSITIES: Ranged from 5 to 50 individuals per acre (12 to 123/ha) in late summer (Hamilton 1940).

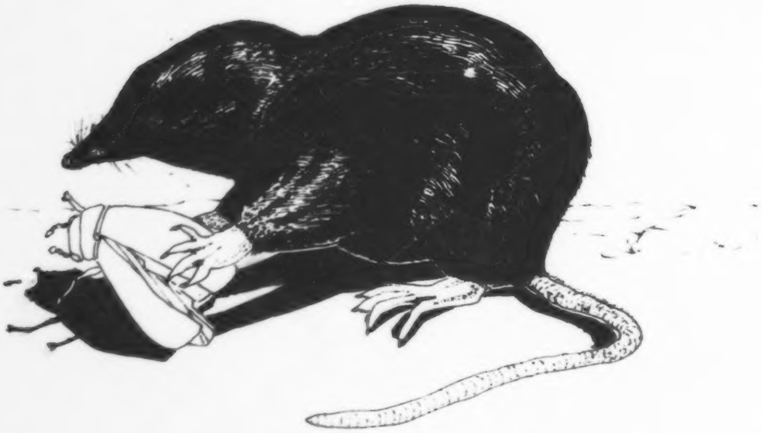
FOOD HABITS: Mainly insectivorous (80 percent) but also eats earthworms, spiders, snails, salamanders, small mammals, and birds (Hamilton 1940:480).

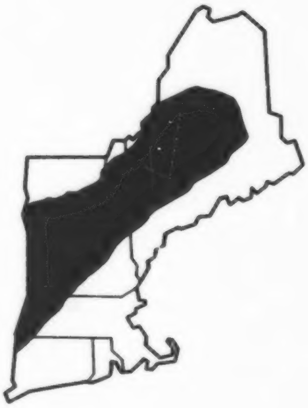
COMMENTS: Usually nests beneath stump, rotten log or in tunnels dug by larger mammals (Banfield 1974:16, Godin 1977:27). Active throughout winter (Banfield 1974:16).

KEY REFERENCES: Banfield 1974, Godin 1977, Hamilton 1940.

Long-tailed Shrew

(Sorex dispar)





RANGE: Central and w. Maine s. in the Appplachians to North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Undetermined—possibly rare.

HABITAT: Cold, damp coniferous forests, typically near moss-covered rocks and logs, which provide shady protective crevices, or wooded talus slopes (Connor 1960, Richmond and Grimm 1950). Also found in deciduous and mixed forest (Burt and Grossenheider 1976:b). Five individuals were found in a 1-year-old red spruce clearcut in West Virginia (Kirkland et al. 1976). Others have been taken in road construction rubble (Conaway and Pfitzer 1952).

SPECIAL HABITAT REQUIREMENTS: Rocky, wooded sites.

REPRODUCTION: Age at sexual maturity: Less than 1 year. Breeding period: Possibly late April to August (Kirkland and Van Deusen 1979). Gestation period: Unknown. Young born: Probably May to August. Litter size: 5 reported (total of 4 records for litter size).

HOME RANGE: Unknown.

SAMPLE DENSITIES: 7 individuals were trapped on 1 acre (0.4 ha) of talus in Pennsylvania (Richmond and Grimm 1950).

FOOD HABITS: Mainly insectivorous. Also eats centipedes and spiders (Connor 1960, Richmond and Grimm 1950).

COMMENTS: Little is known about this shrew. Occasionally it is found in moderate numbers in favorable habitat and is known to be partly subterranean. Also called the rock shrew.

KEY REFERENCES: Connor 1960, Godin 1977, Kirkland and Van Deusen 1979, Richmond and Grimm 1950.

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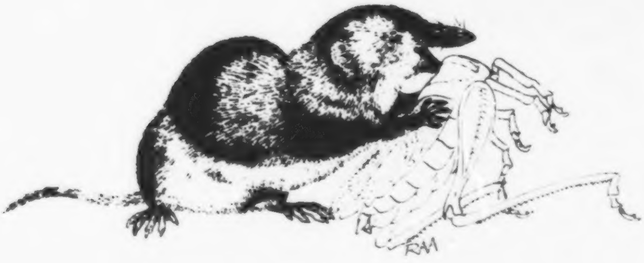
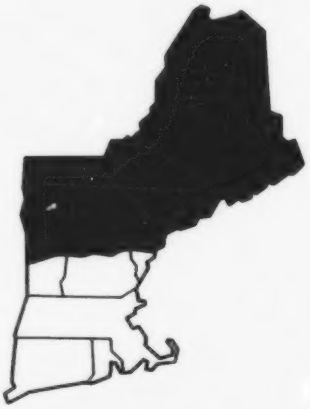
Pygmy shrew

(Sorex hoyi)





RANGE: Gaspé Peninsula w. to s. Wisconsin, s. in the Appalachians to n. Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Generally thought to be rare, but may be fairly common.

HABITAT: Wet or mixed (wet-dry) habitat or less often in dry areas close to water. Found in damp litter especially near rotten stumps and logs in wooded areas. Prefers grassy openings in coniferous forests (Godin 1977:20), but tolerates a variety of habitat conditions (Wrigley et al. 1979). In New Hampshire, this species was more abundant in swamp hardwood than coniferous stands (Hill 1982).

SPECIAL HABITAT REQUIREMENTS: Moist leafmold near water.

REPRODUCTION: Age at sexual maturity: Unknown. Breeding period: Unknown. Gestation period: Unknown. Young born: Unknown. Litter size: Unknown. Litters per year: May bear only 1.

HOME RANGE: Unknown.

FOOD HABITS: Observed eating insects and flesh of small animals in captivity.

COMMENTS: Life history is little known.

KEY REFERENCES: Godin 1977; Long 1972, 1974; Prince 1941; Spencer and Pettus 1966; Wrigley et al. 1979.

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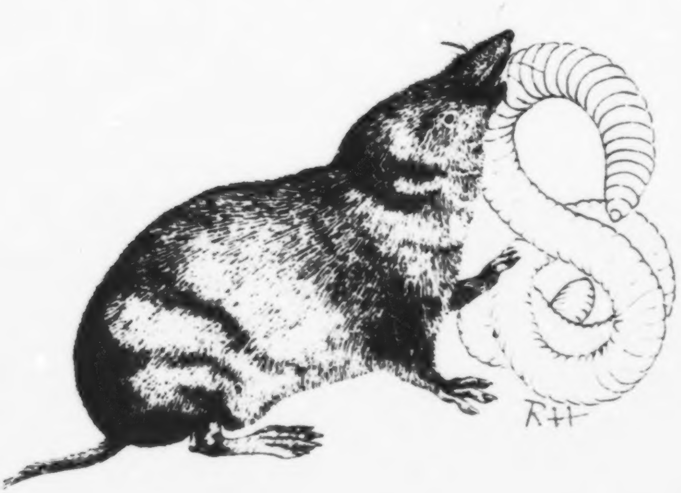
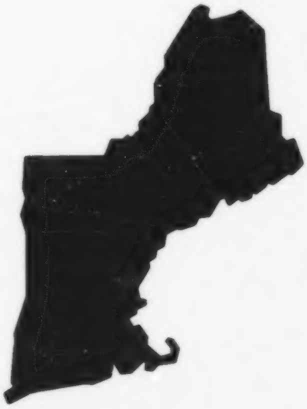
Northern short-tailed Shrew

(Blarina brevicauda)





RANGE: Nova Scotia w. to Saskatchewan, s. to East Texas and s. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Both timbered and fairly open habitats: deciduous, mixed, and less often coniferous forests with moist loose humus; especially common along banks of streams and in meadows with tall rank grasses or sedges, brush piles, and stone walls. Avoids dry, warm sites (Getz 1961a, Pruitt 1959). Favored grass-sedge marsh and willow-alder shrub zone in Manitoba (Wrigley et al. 1979).

SPECIAL HABITAT REQUIREMENTS: Low vegetation, loose leaf litter, high humidity.

REPRODUCTION: Age at sexual maturity: Early females may mature in 6 weeks, but probably do not breed until a year after their birth. Breeding period: March to September. Gestation period: 21 to 22 days. Young born: April to September. Litter size: 3 to 10, average 4.5 (Banfield 1974:23). Litters per year: 2 to 3.

HOME RANGE: 1.0 to 1.25 acres (0.40 to 0.51 ha) (Banfield 1974:22), 0.5 to 1.0 acre (0.2 to 0.4 ha) (Burt and Grossheider 1976:16).

SAMPLE DENSITIES: Densities of up to 48 individuals per acre (119/ha) have been reported in good habitats (Banfield 1974:22).

FOOD HABITS: Mainly insects, plants, worms, sowbugs, snails, small vertebrates, centipedes and millipedes, spiders (Banfield 1974:23).

COMMENTS: Active day and night throughout the year. More fossorial than other shrews; digs own tunnels and uses burrows of other vertebrate species, especially voles.

KEY REFERENCES: Banfield 1974; Blair 1940a, 1941; Burt 1940; Hamilton 1931a; Wrigley et al. 1979.

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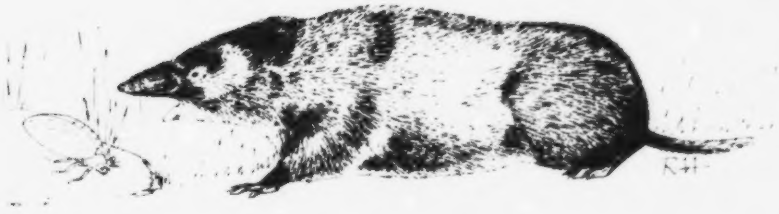
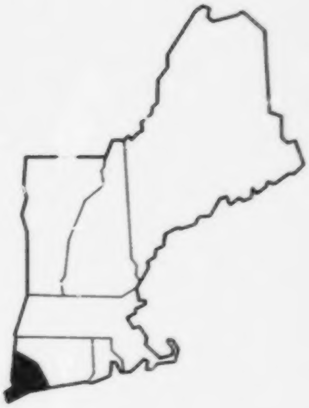
Least Shrew

(Cryptotis parva)





RANGE: Southwestern Connecticut w. through c. New York to South Dakota, s. through e. Texas and Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Undetermined-may be fairly common. Seldom caught in traps, but remains are often found in owl pellets (Banfield 1974:25).

HABITAT: Open grassy areas with or without scattered brush, salt marshes, woodland edges (Banfield 1974:25, Godin 1977:34).

SPECIAL HABITAT REQUIREMENTS: Loose soils for tunnels (often uses runways of larger mice and shrews).

REPRODUCTION: Age at sexual maturity: About 40 days (Godin 1977:35). Breeding period: Early March to early November (at northern edge of range) (Hamilton 1944). Gestation period: About 15 days (Godin 1977:35). Young born: Late March to late November. Litter size: 3 to 6, average 4 or 5 (Godin 1977:35). Litters per year: Probably 2 to 3.

HOME RANGE: Unknown.

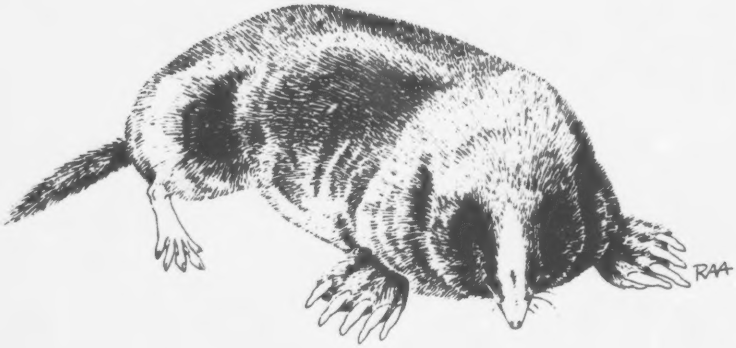
FOOD HABITS: Insects, mollusks, amphibians, lizards, worms, mammals, and vegetable matter (Hamilton 1944).

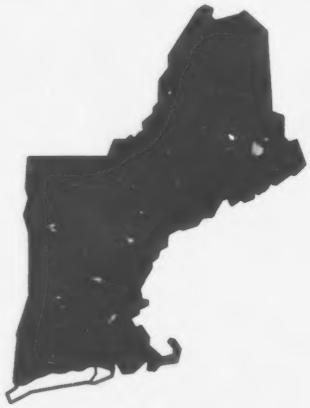
COMMENTS: Rarely nests in burrows. More often uses hollows under stones, logs, or stumps. Highly social—31 individuals were found in one winter nest (Burt and Grossenheider 1976:15).

KEY REFERENCES: Conaway 1952, Hamilton 1944, Mock 1970.

Hairy-tailed Mole

(Parascalops breweri)





RANGE: New Brunswick and se. Quebec w. to se. Ontario s. through e. Ohio and w. North Carolina (Appalachian Mountains).

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Open woods and meadows with light, sandy loam. Prefers areas with vegetative cover and sufficient moisture. Avoids heavy wet soils.

SPECIAL HABITAT REQUIREMENTS: Loose moist well-drained soil.

REPRODUCTION: Age at sexual maturity: 10 months (Eadie 1939). Breeding period: March and April (New Hampshire, Eadie 1939). Gestation period: About 30 days. Young born: April and May. Litter size: 4 or 5, average 4. Litters per year: 1 (possibly 2).

HOME RANGE: About 0.2 acre (0.1 ha) (Eadie 1939).

SAMPLE DENSITIES: An average density of 1.2 moles per acre (3/ha) on 27 acres (11 ha) and a maximum density of 11 individuals per acre (27/ha) has been reported in various habitats in New Hampshire (Eadie 1939). 10 to 12 moles per acre (25 to 30/ha) have been reported in maple-beech-hemlock woods in New York (Hamilton 1939a).

FOOD HABITS: Earthworms, insects (adults, larvae, pupae), millipedes, centipedes, snails, slugs, sowbugs (Godin 1977:37); forages on forest floor at night.

COMMENTS: Constructs two tunnel systems—one shallow (just below surface), the other deep (10 to 18 inches, 25 to 46 cm). Permanent deep tunnels are sites of breeding and winter nests (Eadie 1939) and may be used for several years.

KEY REFERENCES: Eadie 1939, Godin 1977, Hallett 1978.

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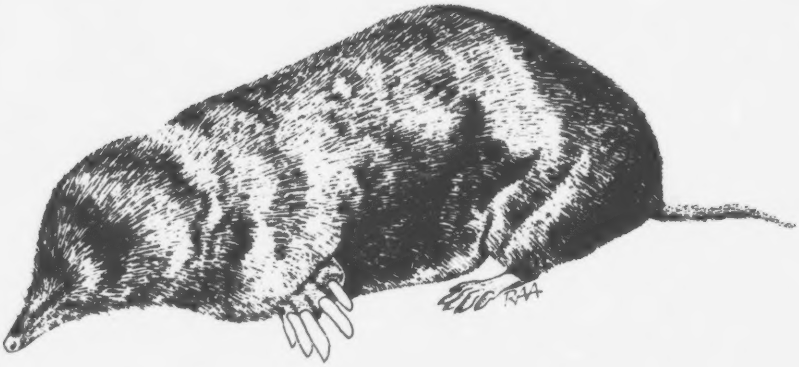
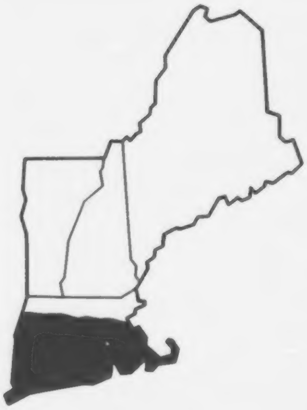
Eastern Mole

(Scalopus aquaticus)





RANGE: Massachusetts w. to Wyoming s. to c. Texas and the Gulf of Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Pastures, meadows, lawns, and less often in open woodland, in loamy or sandy soils that permit easy digging. Often in moist (not wet) bottomlands where earthworms are plentiful.

SPECIAL HABITAT REQUIREMENTS: Soft moist soils containing earthworms.

REPRODUCTION: Age at sexual maturity: 1 year. Breeding period: March and April. Gestation period: 42 to 45 days. Young born: Late April or May. Litter size: 2 to 5. Litters per year: 1.

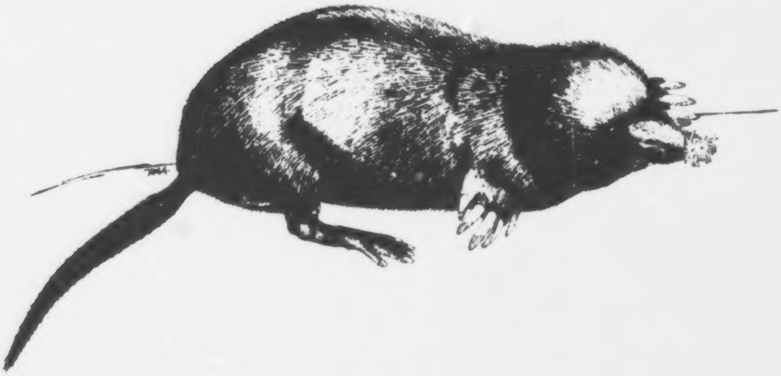
HOME RANGE: Average area 0.74 ha (0.3 acre) for 7 moles in Kentucky, 4 males averaged 1.09 ha (0.4 acre; 3 females averaged 0.28 ha (0.1 acre) (Harvey 1967).

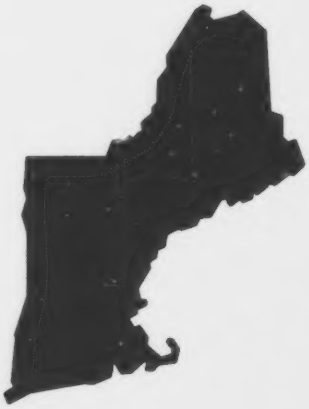
SAMPLE DENSITIES: Active throughout the year during all hours of day and night except early morning and early evening (Harvey 1967). Digs tunnels just below surface or in dry or cold weather excavates deeper burrows 10 inches or more deep. Spends most of life below ground. Young are independent when about 1 month old (Godin 1977:38). Solitary except during breeding season.

KEY REFERENCES: Arlton 1936, Harvey 1967, Yates and Schmidly 1978.

Star-nosed Mole

(Condylura cristata)





RANGE: Southern Labrador w. to sw. Manitoba, se. through n. Ohio, s. in the Appalachians through w. North Carolina and along the coast to the ne. corner North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Prefers low wet ground near bodies of water, swamps, wet meadows, occasionally wet spots in fields or low-lying woods. Has been found in mixed hardwood strands with dry soils near water.

SPECIAL HABITAT REQUIREMENTS: Wet, mucky humus.

REPRODUCTION: Age at sexual maturity: 10 months. Breeding period: April and May. Gestation period: About 45 days. Young born: May and june. Litter size: 3 to 7, average 5.4. Litters per year: 1.

HOME RANGE: Probably about 1 acre (0.4 ha) (Banfield 1974:36).

SAMPLE DENSITIES: 10 individuals per acre (24.7/ha) have been reported in late winter in New York (Eadie and Hamilton 1956).

FOOD HABITS: Aquatic insects, earthworms, crustaceans, slugs, snails, isopods, small fish (occasionally), and small amounts of vegetable material. Forages above ground at night.

COMMENTS: Excellent swimmer, spending much time in water. Usually lives in small colonies (Eadie and Hamilton 1956). Active day and night throughout the year. Has been found swimming under the ice of streams and ponds (Hamilton 1931b). Not uncommon on ground surface.

KEY REFERENCES: Eadie and Hamilton 1956, Hamilton 1931b.

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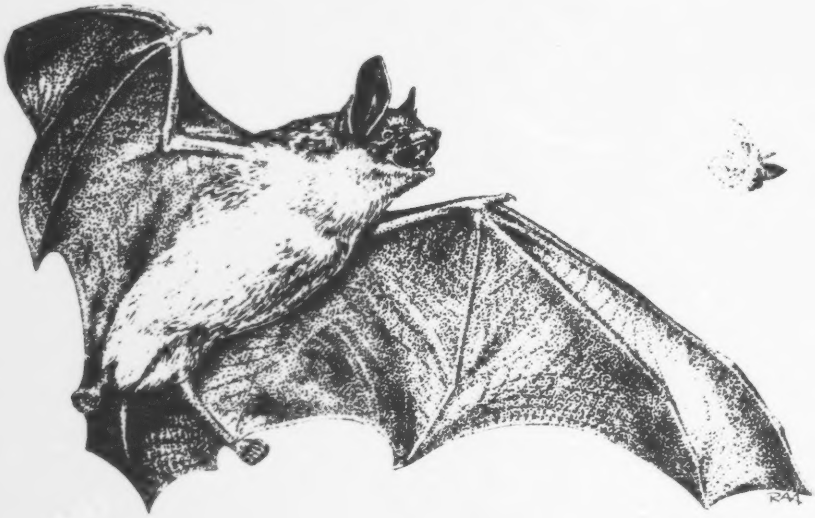
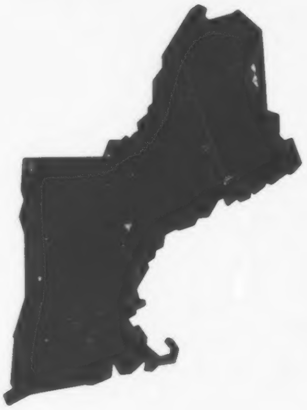
Little Brown Myotis

(Myotis lucifugus)





RANGE: Labrador w. to s. Alaska s. to Georgia (in the Appalachians) Arkansas and s. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeds in caves in fall. Females seek attics and barns in spring for maternity colonies. Roosting habitat: caves, quarries, mine tunnels, hollow trees, buildings. Winter habitat: caves with constant 40° F (4°C) temperatures and 80 percent relative humidity (Banfield 1974:42)

SPECIAL HABITAT REQUIREMENTS: Females seek dark, warm sites for maternity colonies. Males seek cooler daytime roosts, frequently in valleys near streams and marshes.

REPRODUCTION: Age at sexual maturity: About 6 to 9 months for females, 1 year for males. Breeding period: Usually from September to October with fertilization delayed until spring. Gestation period: 50 to 60 days (estimate) (Wimsatt 1945). Young born: Mid-June to early July. Litter size: 1. Litters per year: 1.

HOME RANGE: Unknown.

SAMPLE DENSITIES: Summer density: average 26 bats per square mile (10/km^2) over an 8,600-square-mile (22,274 km^2) area served by a cave in southern Vermont. Winter density: In caves in southern Vermont—300,000 ± 30,000 (Davis and Hitchcock 1965).

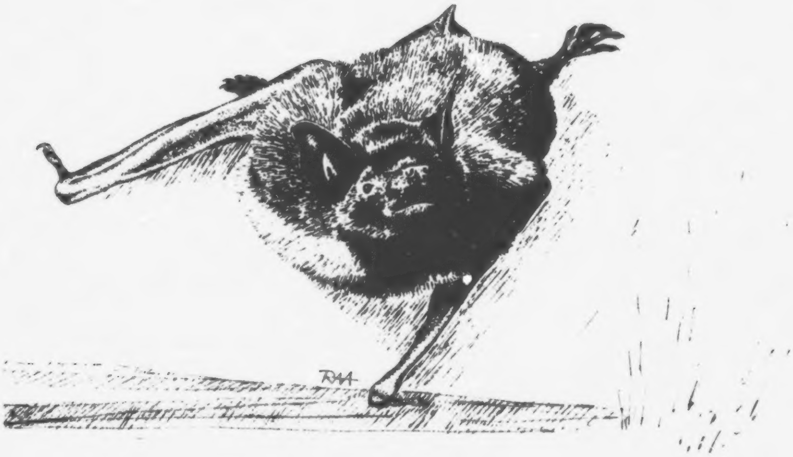
FOOD HABITS: Congregate over water to drink and hawk flying insects, especially midges and mosquitoes, but also beetles, moths, and caddisflies (Anthony and Kunz 1977).

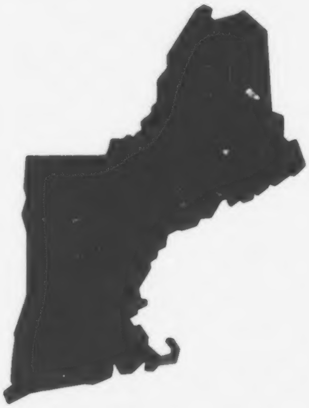
COMMENTS: Breeding colonies of 12 to 1,200 have been reported in Vermont. Females seek nursery sites in late April and disperse July to mid-September (Davis and Hitchcock 1965).

KEY REFERENCES: Barbour and Davis 1969; Cagle and Cockrum 1943; Davis and Hitchcock 1965; Griffin 1940b, 1945; Humphrey and Cope 1976; Wimsatt 1945.

Keen's Myotis

(Myotis keenii)





RANGE: Newfoundland and Nova Scotia w. to Saskatchewan, s. to Wyoming and n. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Females seek attics, barns, and tree cavities for small nursery colonies. Both sexes roost singly or in small colonies in crevices under loose tree bark, in cliff walls, or in caves.

SPECIAL HABITAT REQUIREMENTS: For hibernation, Keen's myotis seeks caves or mine shafts with temperatures near 40° F (4.5° C), high relatively humidity (Banfield 1974:46), and calm air (Fitch and Shump 1979).

REPRODUCTION: Age at sexual maturity: About 6 to 9 months for females, 1 year for males. Breeding period: September to October with fertilization delayed until spring. Gestation period: 50 to 60 days. Young born: Mid-June to early July. Litter size: 1. Litter per year: 1.

HOME RANGE: Unknown.

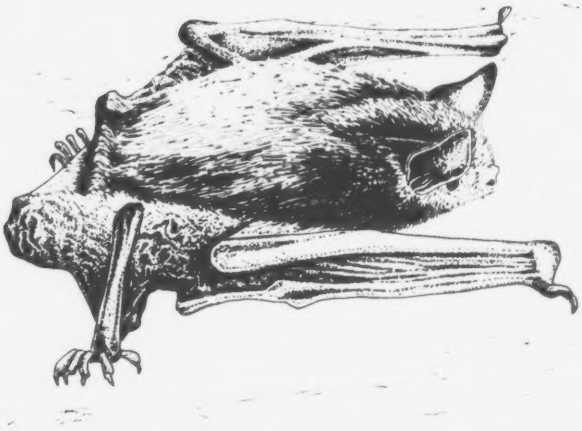
FOOD HABITS: Little is known—probably similar to little brown myotis (Godin 1977:49). Forages over ponds and clearings and high along the forest edge (Cowan and Guiquet 1965). Stomachs of three individuals in Indiana contained assassin bugs, moths, butterflies, flies, leaf hoppers, and other unidentified insects (Whitaker 1972a).

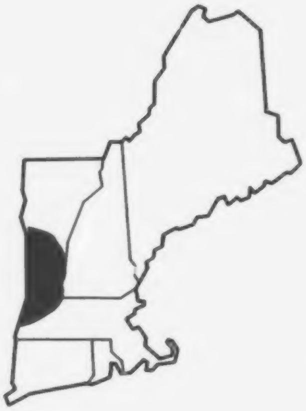
COMMENTS: Locally and irregularly distributed within its range. Several hundred individuals were observed hibernating in caves in Canada (Hitchcock 1949). Frequently found mixed with *Myotis lucifugus* during hibernation.

KEY REFERENCES: Banfield 1974, Barbour and Davis 1969, Fitch and Shump 1979, Godin 1977.

Indiana Myotis

(Myotis sodalis)





RANGE: Eastern New York and probably s. Vermont and w. Massachusetts.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and endangered.

HABITAT: Favors limestone caves with pools of water. Solitary females or small maternity colonies bear young in hollow trees or under loose bark. Cannot tolerate high temperatures of attics.

SPECIAL HABITAT REQUIREMENTS: Caves for hibernation that have cool, stable temperatures of 40° to 46° F (4° to 8° C) throughout the winter (Humphrey 1978). Trees for nursery colonies.

REPRODUCTION: Age at sexual maturity: About 6 months. Breeding periods: Early October (Kentucky). Gestation period: Unknown. Young born: Late June. Litter size: 1.

HOME RANGE: Unknown.

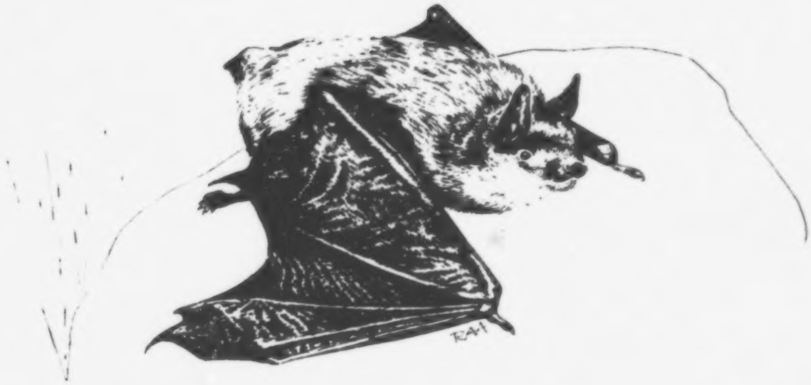
FOOD HABITS: Forages in the foliage of crowns of trees 7 to 98 feet. (2 to 30 m) tall along the shores of rivers and lakes and over floodplains (Humphrey et al. 1977). Four stomachs examined in Indiana contained ichneumons, leafhoppers, beetles, and unidentified wasps (Whitaker 1972a).

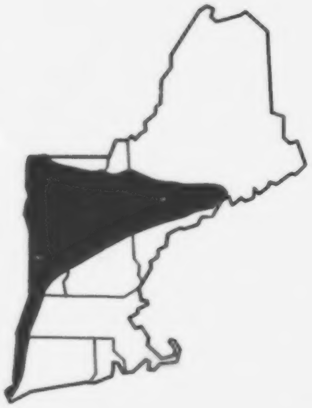
COMMENTS: Band recoveries revealed seasonal movement of up to 320 miles (512 km) (Hall 1960). Hibernation period may last from mid-September to early June (averages mid-October to mid-April). 97 percent of total population of Indiana myotis hibernates in four large caves in southern Indiana, Illinois, Missouri, and Kentucky (Hall 1962). Population has decreased by 28 percent in 15 years (Humphrey 1978). It may now be extinct in New England.

KEY REFERENCES: Barbour and Davis 1969; Godin 1977; Hall 1960, 1962.

Small-footed Myotis

(Myotis leibii)





RANGE: Southeastern Canada w. through the Midwestern United States to e. Washington s. to Mexico, w. Texas and n. Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: In or near woodland in caves, mine tunnels, buildings, crevices in rocks. Maternity colonies have been observed in buildings (Hitchcock 1955).

SPECIAL HABITAT REQUIREMENTS: Tolerates cold, dry places for hibernation from mid-November to March (Barbour and Davis 1969:104).

REPRODUCTION: Age at sexual maturity: Unknown. Breeding period: Unknown. Gestation period: Unknown. Young born: Single young found at the end of May in California; a pregnant female found in mid-July in Nebraska (Quay 1948). Litter size: Probably 1.

HOME RANGE: Unknown.

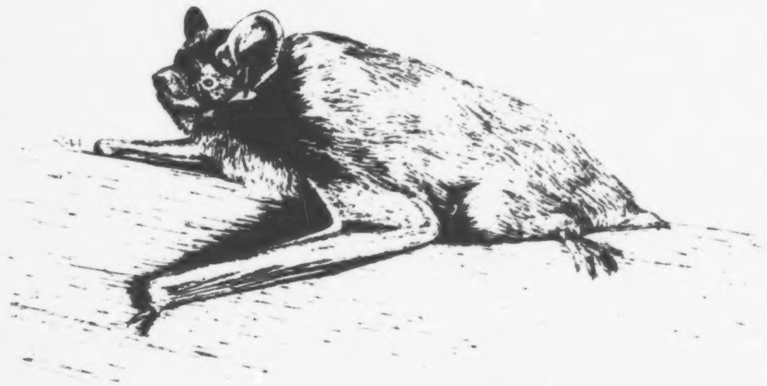
FOOD HABITS: Unknown. Probably similar to other myotids. Flies, bugs, beetles, and ants found in stomachs of two specimens (Cockrum 1952:62).

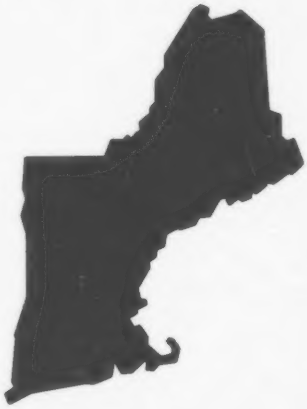
COMMENTS: Hibernates in cold, dry caves or mines from November to April (Pennsylvania). Associated with caves in the foothills of mountains up to 2,000 feet (610 m) in coniferous woodlands (hemlock, spruce, white cedar) (Hitchcock 1949).

KEY REFERENCES: Banfield 1974, Barbour and Davis 1969, Godin 1977, Hitchcock 1949, Mohr 1936.

Silver-haired Bat

(Lasionycteris noctivagans)





RANGE: Southern Canada w. to s. Alaska s. to c. California, c. Texas and South Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Forested areas near lakes or streams. Roosts in foliage of trees, in tree cavities and under loose bark as well as in buildings or caves. Frequently found in coniferous forests of mountains.

SPECIAL HABITAT REQUIREMENTS: Dead trees with loose bark or cavities for summer roosting sites, water courses.

REPRODUCTION: Age at sexual maturity: First summer. Breeding period: Late September with delayed fertilization. Gestation period: 50 to 60 days (Druecker 1972). Young born: June or July. Litter size: 2 (occasionally 1). Litters per year: 1.

HOME RANGE: Unknown.

FOOD HABITS: Feeds among trees and over ponds and streams often less than 20 feet above surface; may prefer emerging aquatic insects (Banfield 1974:54).

COMMENTS: Solitary in summer. Sexes remain separated except during breeding period. Migrates to southern parts of range, generally hibernates under loose bark or in tree cavities or buildings. Erratic in abundance throughout its wide range.

KEY REFERENCES: Banfield 1974, Barbour and Davis 1969, Godin 1977.

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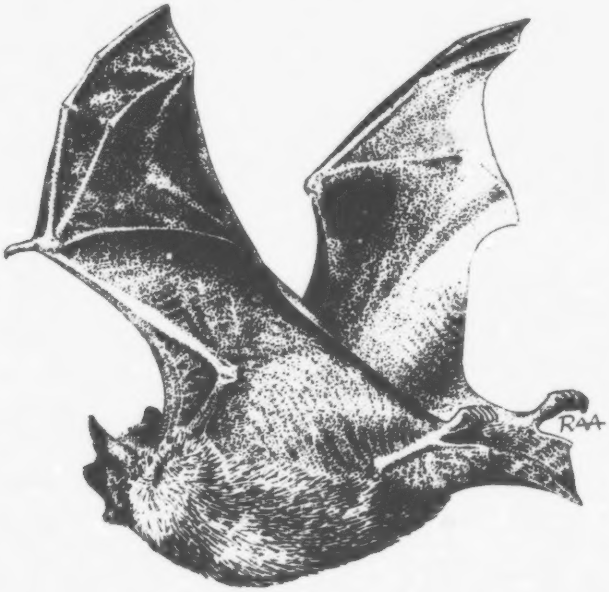
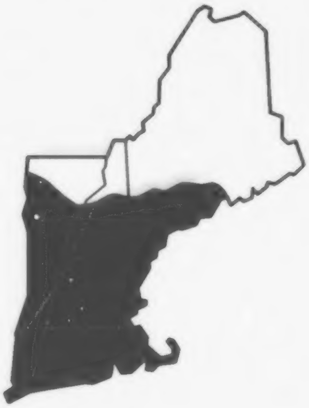
Eastern Pipistrelle

(Pipistrellus subflavus)





RANGE: Southeastern Canada w. to Minnesota, s. to e. Mexico and Central America. Absent from n. New England, Michigan, and s. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Open woods near water, crevices in cliffs, buildings, caves. Avoids deep woods. Commonly roosts in trees during summer days.

SPECIAL HABITAT REQUIREMENTS: Warm, draft free, damp sites for hibernation (Banfield 1974:57), open woods (Godin 1977:54).

REPRODUCTION: Age at sexual maturity: Probably first summer. Breeding period: October to November and frequently in early spring. Gestation period: About 45 days (Hall 1956:3). Young born: Late June to mid-July. Litter size: Usually 2.

HOME RANGE: Believed to feed within a radius extending at least 5 miles (8 km) from roosting site.

FOOD HABITS: Usually solitary feeder. Prefers to feed over rivers, pastures (if large trees are nearby) and high in bordering trees in search of flies, beetles, ants, bugs, moths, wasps (Banfield 1974:57, Godin 1977:54). Leaf hoppers are important food (Whitaker 1972a).

COMMENTS: Selects warm draftless spots for hibernation (mid-October to May) (Banfield 1974:57) in caves, mines, and rock crevices (Godin 1977:54). Usually hangs singly or in pairs.

KEY REFERENCES: Banfield 1974, Barbour and Davis 1969, Davis and Mumford 1962, Hall 1956.

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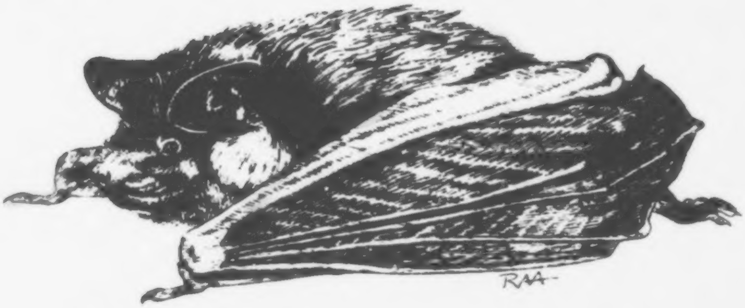
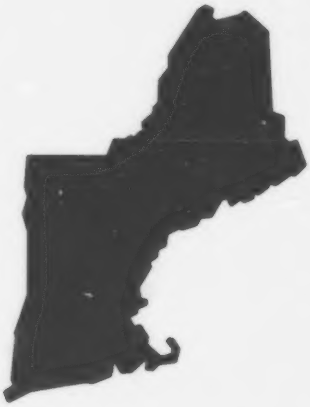
Big Brown Bat

(Eptesicus fuscus)





RANGE: Southern Canada w. to Alaska s. to n. Florida and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Buildings, bridges, caves, tunnels, hollow trees in wooded areas; avoids hot attics.

SPECIAL HABITAT REQUIREMENTS: Seems to require cold, dry areas of caves or buildings for hibernation (Hitchcock 1949).

REPRODUCTION: Age at sexual maturity: Females: first autumn. Males: 1 year. Breeding period: September through March. Peak: September. Fertilization occurs in April. Gestation period: About 2 months. Young born: June. Litter size: Usually 2 in the East, 1 in the West. Litters per year: 1.

HOME RANGE: Probably travels less than 30 miles (48 km) from birthplace (Barbour and Davis 1969:127) and often uses the same site for summer roosting and hibernation.

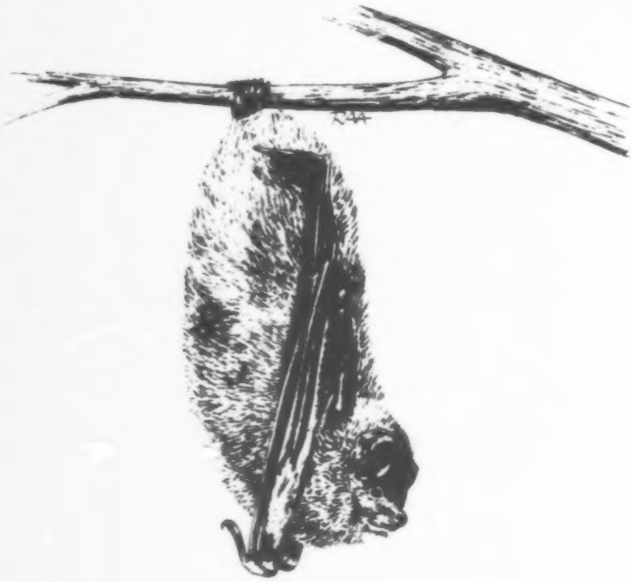
FOOD HABITS: Beetles, wasps, flies, bugs, and other flying insects (Hamilton 1933a). Beetles accounted for the highest percentage of diet in Indiana (Whitaker 1972a). Individuals may use the same feeding ground each night (Barbour and Davis 1969:121). General in foraging habitat (Humphrey 1982).

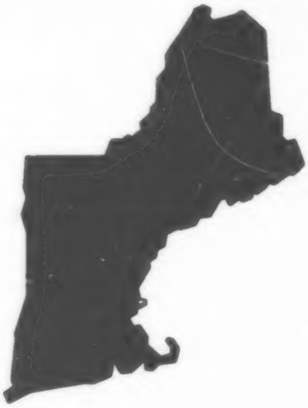
COMMENTS: Hibernation begins in November. Nursery colonies are relatively small, usually with a maximum of 700 individuals (Mills et al. 1975). In New England, nursery colonies seldom exceed 200 individuals.

KEY REFERENCES: Barbour and Davis 1969, Godin 1977, Mills et al. 1975, Phillips 1966.

Red Bat

(Lasiurus borealis)





RANGE: Southern Canada from Nova Scotia w. to British Columbia s. to Texas and n. Florida, also n. California s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Wooded areas where it roosts in trees 5 to 40 feet (1.5 to 12.2 m) above ground (McClure 1942). Solitary except females with young. Rarely found in buildings or caves except during migration. In Maryland, bats favored deciduous woodlands (Paradiso 1969:54). Greatest numbers were found along fence rows and forest edges, in roosting areas open only from below (Constantine 1966). Most active over water early in evening (Kunz 1973).

SPECIAL HABITAT REQUIREMENTS: Possibly trees for roosting.

REPRODUCTION: Age at sexual maturity: Second summer. Breeding period: August to October, fertilization occurs in spring. Gestation period: 60 to 70 days. Young born: Late May to early July, mid-June in Indiana (Whitaker and Mumford 1972) and Iowa (Kunz 1971). Litter size: 1 to 5, average 2.3. Litters per year: 1.

HOME RANGE: Unknown, however, known to forage 600 to 1,000 yards (546 to 910 m) from day roosts (Jackson 1961:95).

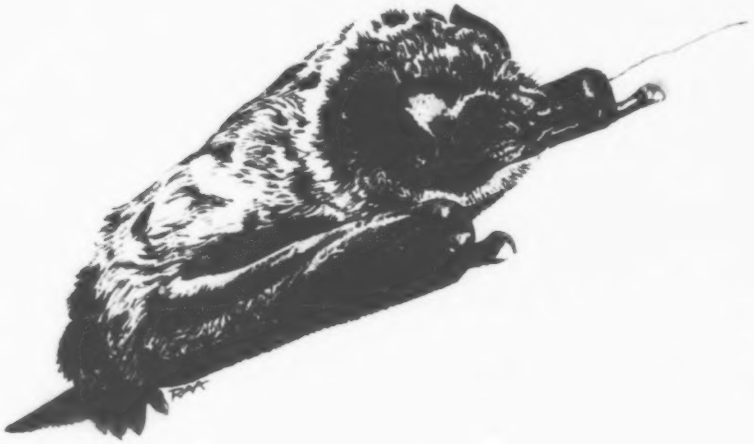
SAMPLE DENSITIES: 1 individual per acre (2.4/ha) in Iowa (McClure 1942).

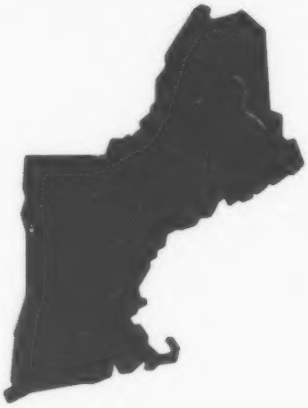
FOOD HABITS: Feeds at height of tree foliage to ground, sometimes in pairs and often repeatedly follows the same route about 100 yards (91 m) in length (Burt and Grossenheider 1976:37). Eats moths, beetles, bugs, flies, crickets, and other insects.

COMMENTS: Migrates south in autumn wintering from Maryland and Washington, D.C., to the Gulf States (Banfield 1974:62, Paradiso 1969:55).

KEY REFERENCES: Barbour and Davis 1969, Godin 1977, Layne 1958, McClure 1942.

Hoary Bat
(Lasiurus cinereus)





RANGE: Southern Canada s. to c. Florida and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare.

HABITAT: Wooded areas where it roosts 10 to 15 feet (3 to 4.5 m) above ground in trees (Constantine 1966). Prefers coniferous forests but also uses deciduous woods and woodland edges, hedgerows and trees in city parks (Godin 1977:60).

SPECIAL HABITAT REQUIREMENTS: Forest edge.

REPRODUCTION: Age at sexual maturity: Most become mature during first summer (Druecker 1972). Breeding period: September to November. Peak: Early September. Gestation period: Believed to be about 90 days (Jackson 1961) Young born: Mid-May to early July. Litter size: 1 to 4, average 2. Litters per year: 1.

HOME RANGE: Feeding range may extend a mile (1.6 km) or more from roosting site (Paradiso 1969:58).

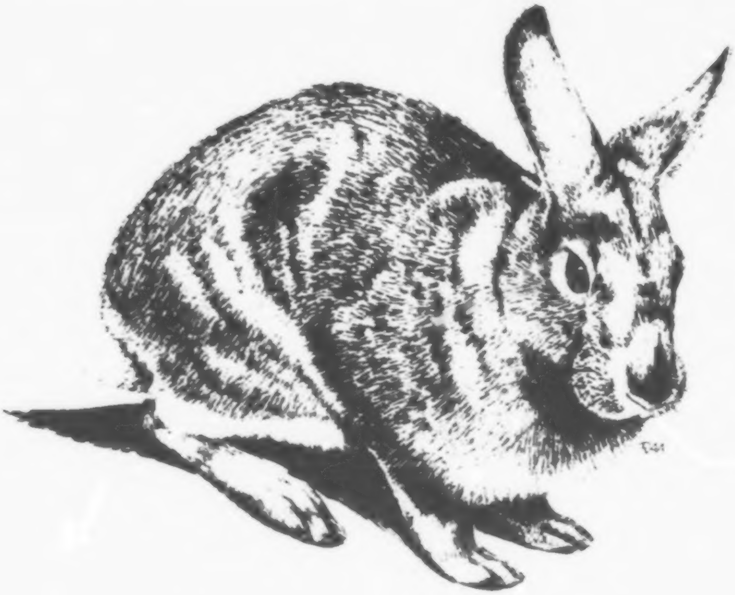
FOOD HABITS: Forages for insects over lakes and forest clearings (Banfield 1974:64). Out of 139 hoary bats examined in New Mexico, 136 contained moths, up to 25 individuals per bat (Ross 1967). Has been seen attacking pipistrelles in New York (Bishop 1947) and in California (Orr 1950).

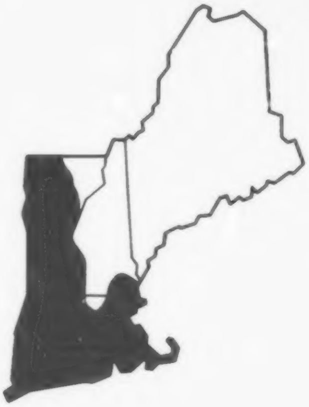
COMMENTS: Largest of eastern bats. Females do not form maternity colonies. Sexes separate when young are born and remain segregated most of summer (Godin 1977:61). Migrates in waves to Southern United States and Central America. Individuals have been found in the North during the winter months (Whitaker 1967).

KEY REFERENCES: Barbour and Davis 1969, Bogan 1972, Godin 1977, Seton 1909.

Eastern Cottontail

(Sylvilagus floridanus)





RANGE: Eastern United States including extreme s. Canada s. through e. Mexico and parts of Central America. Is spreading into New Hampshire at the expense of the New England cottontail (E. Francq, personal communication).

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Farmlands, pastures, fallow fields, open woodlands, thickets along fence rows and stone walls, edges of forests, swamps and marshes, suburban areas with adequate food and cover. Avoids dense woods.

SPECIAL HABITAT REQUIREMENTS: Brush piles, stone walls, dens or burrows for year-round protection from storms and cold weather. Herbaceous and shrubby cover.

REPRODUCTION: Age at sexual maturity: 2 to 3 months. Most females breed the first spring following birth. Breeding period: March to September. Peak: April to August. Gestation period: 26 to 32 days. Young born: March to September. Young disperse at about 7 weeks. Litter size: 3 to 8, typically 5 or 6. Litters per year: 3 to 4.

HOME RANGE: Sizes range from about a half-acre to 40 acres (0.2 to 16.2 ha) or more (Godin 1977:68). Average 1.4 acres (0.57 ha) for adult males and 1.2 acres (0.48 ha) for adult females in Massachusetts (McDonough 1960). Approximately 8 acres (3.2 ha) (Banfield 1974:77).

SAMPLE DENSITIES: 0.46 animal per acre (1.1/ha) on 75-acre (30.4-ha) plot in Iowa during month of June, increasing to 1.65 per acre (4/ha) in August, followed by a drop to 0.89 per acre (2.2/ha) in October (Banfield 1974:77).

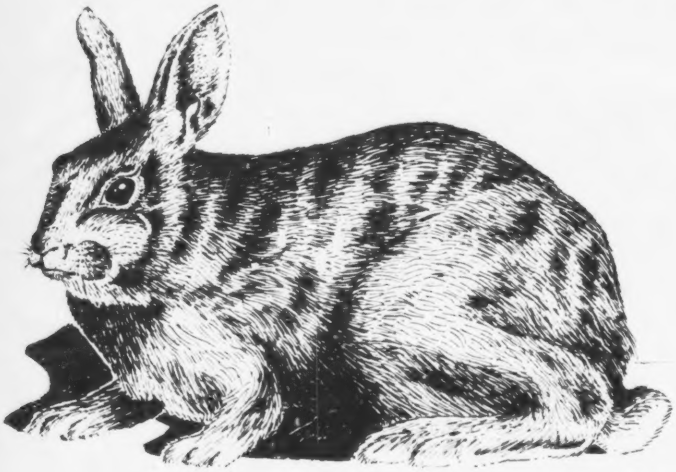
FOOD HABITS: Crepuscular and nocturnal feeder. Most feeding takes place 2 to 3 hours after sunrise and within the hour following sunset. Summer foods: tender parts of grasses and herbs. Winter foods: Bark, twigs and buds of shrubs and young trees such as maple, birch, and oak. Coprophagic.

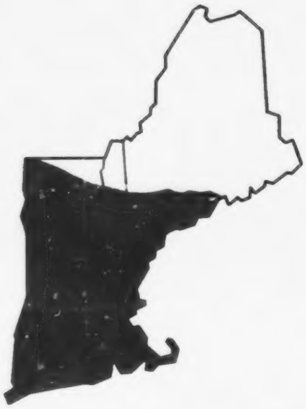
COMMENTS: The eastern cottontail was introduced into New England in the late 1800's. Female does not dig a burrow—uses abandoned woodchuck hole or digs a shallow nest in soft earth that is well concealed by surrounding vegetation.

KEY REFERENCES: Beule and Studholme 1942, Chapman et al. 1977, Dalke and Sime 1938, Haugen 1942.

New England Cottontail

(Sylvilagus transitionalis)





RANGE: Central and s. New England s. through e. New York, Pennsylvania, n. New Jersey and the Appalachian Mountains (to slightly above 4,000 feet, 1,220 m) to Alabama.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (southern New England) to rare (New Hampshire and Vermont).

HABITAT: Brushy areas, open woodlands, swamps, mountains (Fay and Chandler 1955). Reported at beaches, saltmarshes, and open land (Johnston 1972). Also in young woods associated with clearcuts and in hayfields or other grasslands. Dense cover and conifers are frequently components of habitats used by this species (Chapman et al. 1982).

SPECIAL HABITAT REQUIREMENTS: Young woodlands with thick cover. Seldom ventures far from dense cover (Pringle 1960).

REPRODUCTION: Age at sexual maturity: Probably during second year (Dalke 1942:73). Breeding period: March to September. Peak: March to July (Chapman et al. 1977). Gestation period: 28 days (Dalke 1942: 70). Young born: End of March to early April extending through July (Pringle 1960:14). Litter size: 3 to 8, average 5. Litters per year: 2 or 3.

HOME RANGE: 0.5 to 1.8 acres (0.2 to 0.7 ha) (McDonough 1960). Average 3 acres (1.2 ha) for 17 females and 8.3 acres (3.4 ha) for 10 males in swamp and upland woods (Dalke 1942:42).

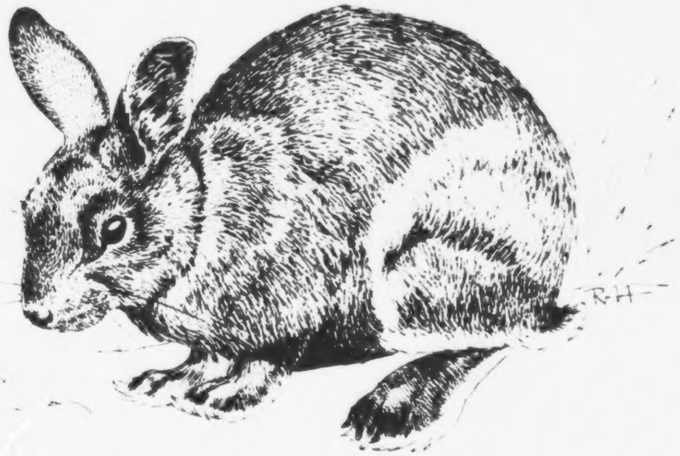
FOOD HABITS: Summer: grasses and herbs. Winter: seedlings, bark, twigs, buds (prefers maple and oak). Coprophagic. Food preference related to availability.

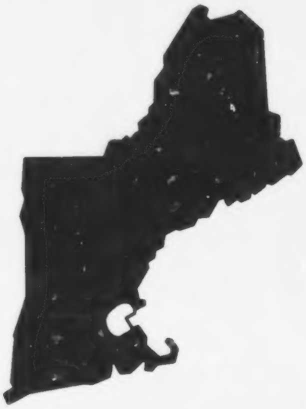
COMMENTS: Crepuscular and nocturnal feeder. No obvious differences were found in the habitat used by the Eastern and New England cottontails (Johnston 1972:38).

KEY REFERENCES: Chapman et al. 1977, Dalke 1942, Fay and Chandler 1955, McDonough 1960, Pringle 1960.

Snowshoe Hare

(Lepus americanus)





RANGE: Newfoundland w. to Alaska s. along the n. United States border, and s. in the Sierras, Rockies, and Appalachians.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in suitable habitat.

HABITAT: Deciduous, coniferous, and mixed woodlands (less often deciduous) with dense brushy understory, conferous swamps, cut-over areas, burns, nearly all types of forests, but favors second growth aspen-birch in vicinity of conifers. In eastern Maine, hare showed a significant shift in activity from coniferous understory in winter to hardwood understory in summer (O'Donoghue 1983).

SPECIAL HABITAT REQUIREMENTS: Dense brushy cover.

REPRODUCTION: Age at sexual maturity: During the spring following birth. Breeding period: March to July. Gestation period: About 37 days. Young born: May to August. Litter size: 1 to 6, average 3. Litters per year: 1 or 2, occasionally 3.

HOME RANGE: Probably about 10 acres (4 ha) (Burt 1957). About 25 acres (10.1 ha) for adult males and 19 acres (7.7 ha) for adult females on an island in northwestern Montana (Adams 1959). Daily ranges for both sexes were about 4 acres (1.6 ha) in mixed woodland—old field habitat in Canada (Bider 1961).

SAMPLE DENSITIES: Populations follow 10- or 11-year cycles with densities ranging from 1 square mile (0.4 km^2) to several hundred per square mile (approximately 100 per km^2).

FOOD HABITS: Mainly crepuscular and nocturnal. Summer: succulent vegetation such as clover, grasses, and ferns. Winter: twigs, buds and bark of small trees and seedlings such as alder and balsam. Coprophagic.

COMMENTS: Pelage turns white in winter following fall molt and returns to brown after spring molt. Young are precocial.

KEY REFERENCES: Aldous 1937, Bider 1961, Dodds 1965, Godin 1977.

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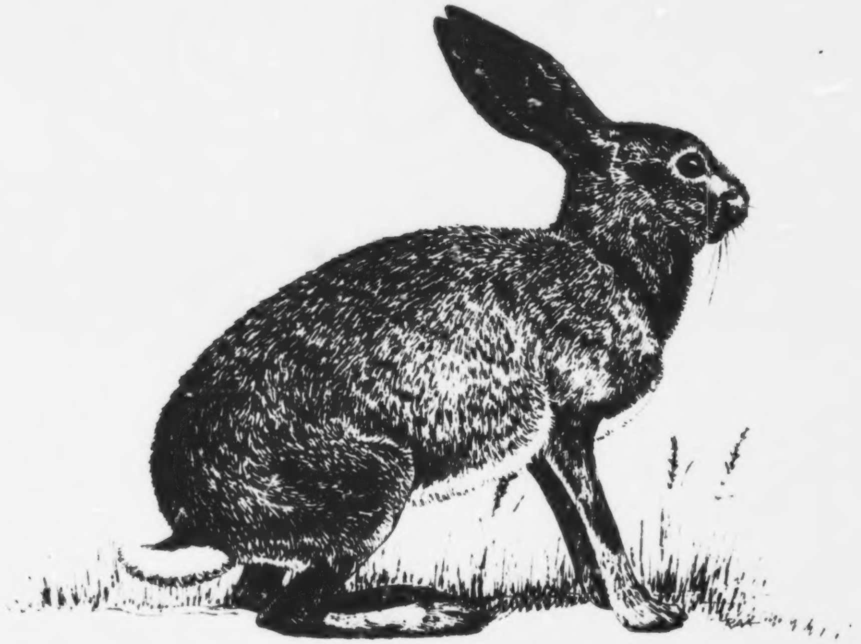
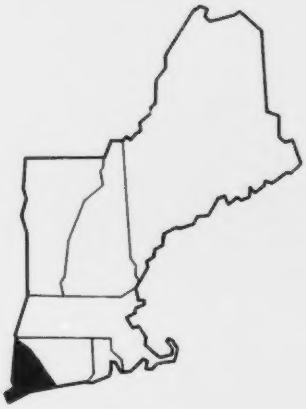
European Hare

(Lepus capensis)





RANGE: Western Connecticut, e. New York, e. Pennsylvania, and w. New Jersey. Introduced to New York from Europe between 1890 and 1910.

RELATIVE ABUNDANCE IN NEW ENGLAND: Probably uncommon.

HABITAT: Open country (mainly agricultural land) with low vegetation and rolling hills. Occasionally uses open woodlands with little ground vegetation.

SPECIAL HABITAT REQUIREMENTS: Open land.

REPRODUCTION: Age at sexual maturity: Probably first spring following birth. Breeding period: January. Gestation period: About 42 days. Young born: March. Litter size: 1 to 3. Litters per year: Unknown.

HOME RANGE: 11 square miles (28.5 km^2) (Eabry 1970). About 12 acres (4.9 ha) (Banfield 1974).

SAMPLE DENSITIES: Average population density was about 25 hares per square mile (10/km^2) in Ontario with a potential density of 100 hares per square mile (39/km^2) under ideal conditions (Banfield 1974).

FOOD HABITS: Summer: grass, clover, corn, fruits such as raspberries, apples. Winter: buds, bark and twigs of young trees and seedlings. Coprophagic.

COMMENTS: Builds no nest. Scrapes a hollow in ground near protective vegetation, rocks.

KEY REFERENCES: Banfield 1974, Dean and DeVos 1965, Godin 1977.

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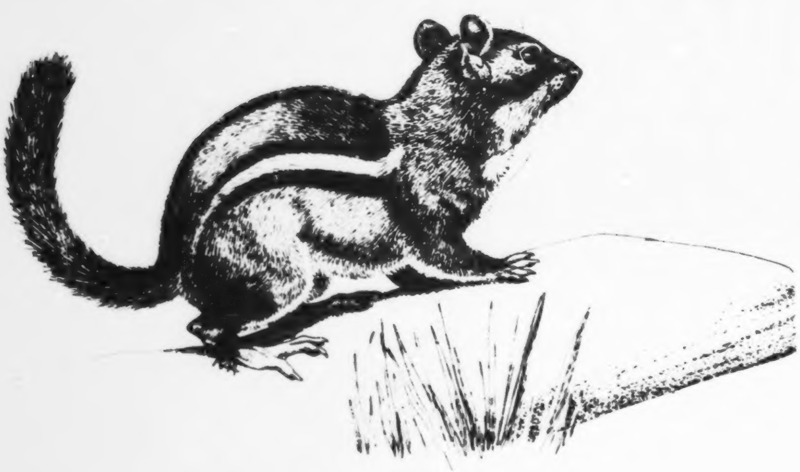
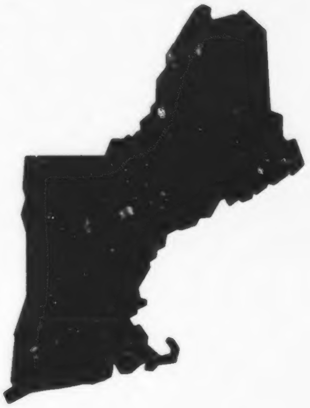
Eastern Chipmunk

(Tamias striatus)





RANGE: Quebec w. to Manitoba s. through most of e. United States to Louisiana and nw. Florida. Absent from most of Coastal Plain.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Edges or interiors of deciduous woodlands with abundant cover of undergrowth, old logs, stone walls. Semi-open brushlands with ample cover.

SPECIAL HABITAT REQUIREMENTS: Tree or shrub cover, elevated perches.

REPRODUCTION: Age at sexual maturity: Females: 3 months (rarely) to 1 year. Males: 7 months to 1 year. Breeding period: Mid-March to early April and early July to early August. Gestation period: About 31 days. Young born: Mid-April to mid-May and mid-July to mid-August. Litter size: 1 to 8, average 4 or 5. Litters per year: 1 or 2.

TERRITORY: A female defended a 50-yard (45.5 m) radius surrounding the living quarters in oak-hickory woodland in Michigan (Burt 1940). Individuals maintain dominance in a core area that covers about 20 percent of home range (Ickes 1974).

HOME RANGE: Less than 100 yards (91 m) in diameter (Burt 1957). 0.5 to 1.0 acre (0.2 to 0.4 ha) in northern hardwoods in the Adirondacks of New York (Elliott 1878:9).

SAMPLE DENSITIES: 2 individuals per acre (5/ha) at onset of breeding season increasing to 4 individuals or more per acre (10+/ha) at end of breeding season (Burt 1957). Up to 30 individuals per acre (74/ha) in good habitats (Seton 1929). Varies geographically and temporally from 0.1 to 15.2 per acre (0.3 to 37.6/ha) (Yerger 1953).

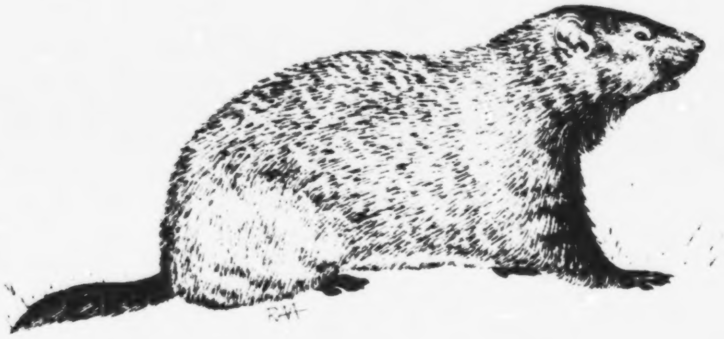
FOOD HABITS: Many kinds of seeds, fruits, nuts, bulbs, insects, meat, and eggs. Feeds during daylight hours.

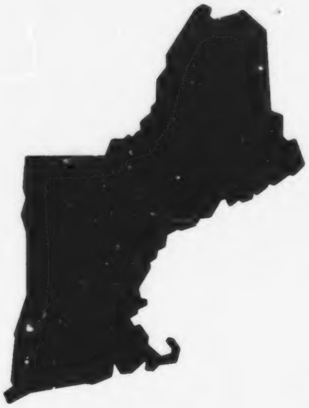
COMMENTS: Hibernates but may become active for short periods in winter. Largely terrestrial. Den is located in underground tunnel system.

KEY REFERENCES: Allen 1938; Burt 1940, 1957; Elliott 1978; Forbes 1966; Yahner 1978; Yerger 1953, 1955.

Woodchuck

(Marmota monax)





RANGE: Newfoundland w. across the s. Canadian provinces to Alaska s. in the e. United States to Arkansas and Alabama.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Edges of woodlands (seldom in interior), open cultivated land, pastures, meadows, open brushy hillsides.

SPECIAL HABITAT REQUIREMENTS: Open land.

REPRODUCTION: Age at sexual maturity: 1 year, but commonly breeds during second year. Breeding period: Early March to mid-April. Gestation period: 31 to 32 days. Young born: Early April to mid-May. Litter size: 2 to 6, average 4. Litters per year: 1.

HOME RANGE: 0.25 to 0.50 mile (0.4 to 0.8 km) in diameter (Burt 1957), In alfalfa and clover the home range boundaries are often within 20 yards (18.2 m) of den (Godin 1977:89).

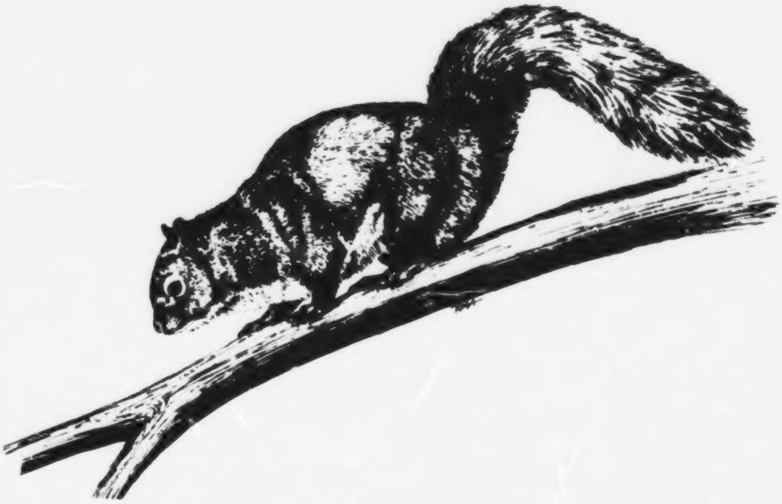
FOOD HABITS: Succulent green vegetation such as alfalfa, clover, grasses, and herbs. Occasionally eats small amounts of insects. Diurnal feeder.

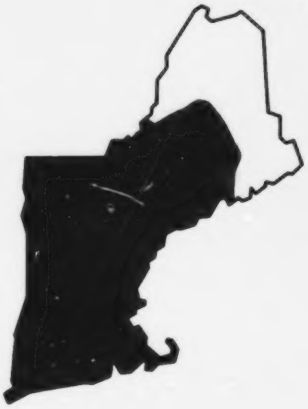
COMMENTS: Fossorial except when feeding. Digs extensive system of burrows including a hibernation and nest chamber. Sometimes uses separate summer and winter dens.

KEY REFERENCES: Fall 1971, Grizzell 1955, Snyder and Christian 1960.

Gray Squirrel

(Sciurus carolinensis)





RANGE: Southern Quebec to Manitoba s. to Texas and Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to abundant.

HABITAT: Deciduous and mixed forests, especially those with trees that produce mast. River bottomland, woodlots in town, city parks.

SPECIAL HABITAT REQUIREMENTS: Oaks, tall trees for dens or leaf nests (nests are usually 25 feet (7.6 m) or more above ground).

REPRODUCTION: Age at sexual maturity: About 3 months (Smith and Barkalow 1967) to 1 year (Allen 1954). Breeding period: Breeding period. January to February, occasionally May and June (second litter). Gestation period: 44 days. Young born: March to April, August. Litter size: 2 to 5, typically 2 or 3. Litters per year: 1 or 2.

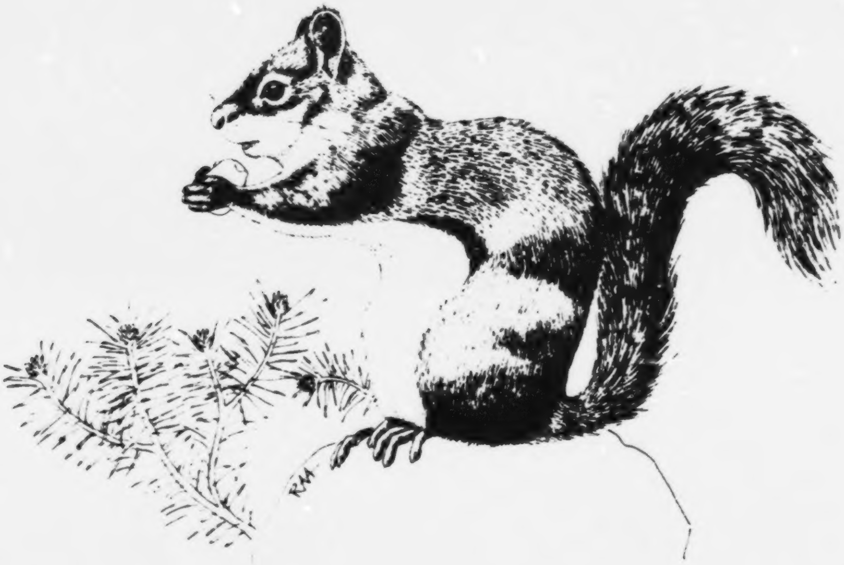
HOME RANGE: 2 to 7 acres (0.8 to 2.8 ha) (Burt and Grossenheider 1976:118). The average minimum home range of 43 individuals in mature oak-hickory woods in West Virginia was 1.24 acres (0.50 ha) (Pack et al. 1967). 1.20 acres (0.49 ha) was the average range of 55 squirrels in mature to over-mature oak-hickory stand in West Virginia (Doebel and McGinnis 1974). 1.40 acres (0.57 ha) in mature oak-hickory, beech and poplar woodlots in Maryland (Flyger 1960).

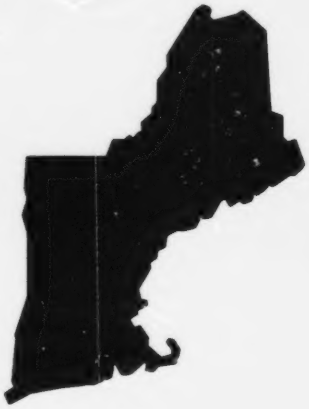
FOOD HABITS: Diurnal feeder. Consumes nuts, buds, seeds and grains, fungi, fruits, birds' eggs, inner bark of trees. Commonly caches food for future use. Will eat insects and then pupae in spring and summer when preferred foods are scarce (H. Smith, personal communication).

COMMENTS: Arboreal, seldom wandering far from trees. In autumn squirrels often move home ranges short distances to areas with greater food supplies (Sharp 1960) and may occasionally migrate in large numbers over many miles (Larson 1962). Usually several squirrels share winter dens.

KEY REFERENCES: Godin 1977, Pack et al. 1967, Uhlig 1955.

Red Squirrel
(Tamiasciurus hudsonicus)





RANGE: Quebec w. to Alaska s. in the Appalachians to Tennessee and in the Rockies to New Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Coniferous, mixed and occasionally deciduous forests, rural woodlots.

SPECIAL HABITAT REQUIREMENTS: Woodlands with mature trees, conifers preferred.

REPRODUCTION: Age at sexual maturity: 1 year. Breeding period: January to September. Peak: Mid-February to March and June to July. Gestation period: 36 to 40 days. Young born: March to May, August to September. Litter size: 1 to 7, typically 4 or 5. Litters per year: 1 or 2.

HOME RANGE: About 1 acre (0.4 ha) when food is plentiful (Hamilton 1939b). 2.73 to 6.03 acres (1.1 to 2.4 ha) (Banfield 1974:139). Less than 200 yards (182 m) in diameter (Burt and Grossenheider 1976:121). Defends feeding and den sites.

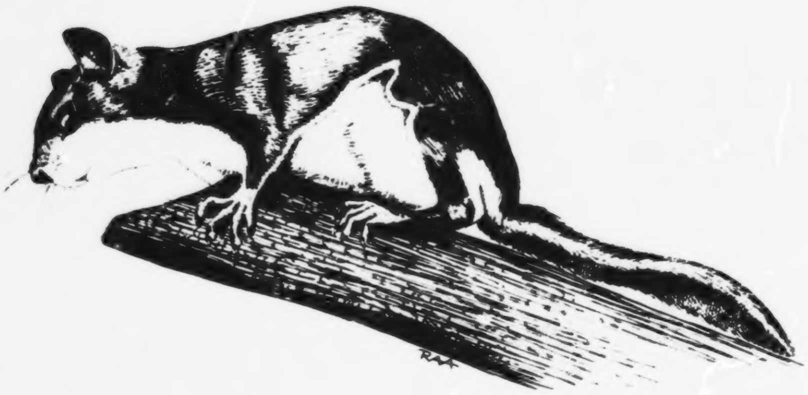
FOOD HABITS: Diurnal and crepuscular. Feeds on seeds of conifers, nuts, buds, sap, tender leaves, fruits, flowers, fungi, insects, birds' eggs, and the young of small vertebrates. Caches food for winter use.

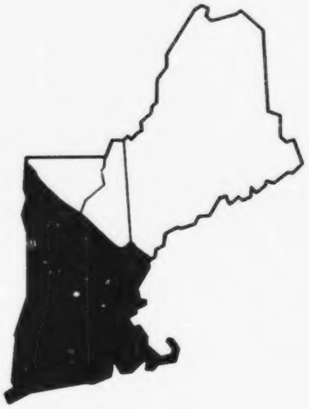
COMMENTS: Prefers to nest in natural cavity or abandoned woodpecker hole. When unavailable, squirrels may construct globular leaf nests near top of tree or next to trunk or use ground burrows. Become inactive for short periods in winter to avoid cold and storms.

KEY REFERENCES: Hamilton 1939b, Hatt 1929, Klugh 1927, Layne 1954.

Southern Flying Squirrel

(Glaucomys volans)





RANGE: Eastern North America from Nova Scotia w. to the Great Lakes and s. to East Texas and s. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Mature deciduous and mixed forests especially beech-maple, oak-hickory and aspen.

SPECIAL HABITAT REQUIREMENTS: Several nest sites per individual (Muul 1968), mature woodland with cavity trees. Favors cavities with entrance diameters of 1.6 to 2 inches (40 to 50 mm) (Dolan and Carter 1977).

REPRODUCTION: Age at sexual maturity: About 6 months. Breeding period: Late February to early March; June to July. Gestation period: About 40 days. Young born: April and May; July and August. Peaks: April and August (Massachusetts). Litter size: 2 to 6, average 3 to 4. Litters per year. 2.

HOME RANGE: Average 0.41 acre (0.17 ha) for females (may defend entire home range) and 0.53 acre (0.21 ha) for males (no defense) in oak-maple habitat in New York (Madden 1974).

SAMPLE DENSITIES: Densities of up to 5 individuals per acre (12/ha) have been reported in woodland in New York (Sollberger 1943).

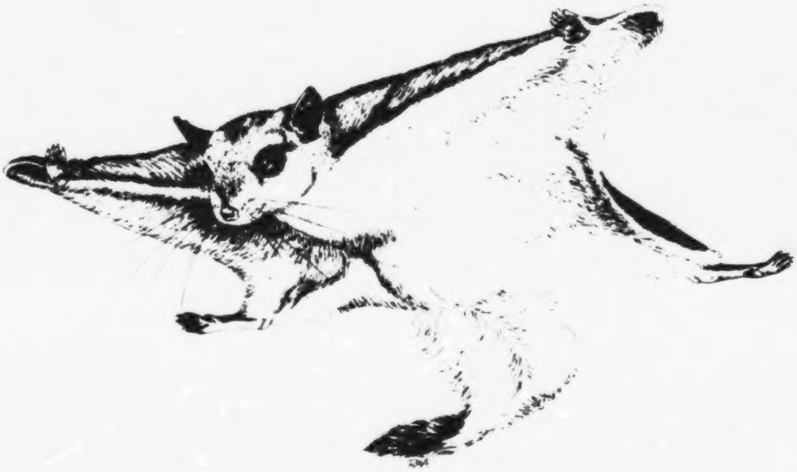
FOOD HABITS: Hickory and other nuts, acorns, seeds and fleshy fruits. Also takes insects and occasionally birds' eggs and fledglings. Most carnivorous of the squirrels. Stores food in den for winter use.

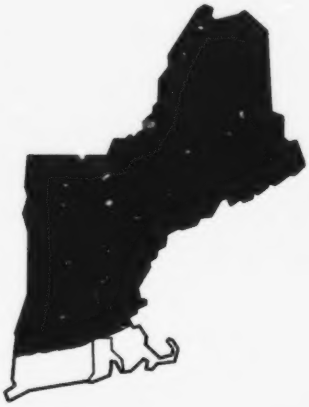
COMMENTS: Nocturnal feeders; highly sociable—several squirrels may occupy same den at once, especially in winter. Favors abandoned woodpecker holes for den sites. Active throughout the year except during extreme winter cold.

KEY REFERENCES: Burt 1940; Jordan 1948; Muul 1968; Sollinger 1940, 1943.

Northern Flying Squirrel

(Glaucomys sabrinus)





RANGE: Canada w. to Alaska, s. in the Eastern United States to s. New England, and in the Appalachians to North Carolina. To the w. the range extends s. to North Dakota, Utah (Rocky Mountains), and n. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Forests of mixed mature conifers and deciduous trees; less often in purely hardwood forests. Favors cool, heavily wooded areas above 1,000 feet (305 m) in elevation.

SPECIAL HABITAT REQUIREMENTS: Mature trees, cavities for winter dens. Arboreal lichens for winter food.

REPRODUCTION: Age at sexual maturity: Probably 6 months to 1 year. Breeding period: February to May and July. Gestation period: About 37 days. Young born: Late March to early July; late August or early September (Godin 1977:103). Litter size: 2 to 6, typically 4 or 5. Litters per year: 1 or 2.

HOME RANGE: Unknown.

FOOD HABITS: Nocturnal feeder. Eats a variety of nuts, especially acorns; also takes seeds, catkins, fruits, buds, insects, mushrooms, birds' eggs, and nestlings. Caches food in tree cavities.

COMMENTS: Summer nest may be constructed on a limb next to tree trunk (usually a conifer). Winter nest is in a cavity, often an old woodpecker hole. Active throughout year except during extreme winter cold. Often highly social in winter dens.

KEY REFERENCES: Banfield 1974, Cowan 1936, Godin 1977.

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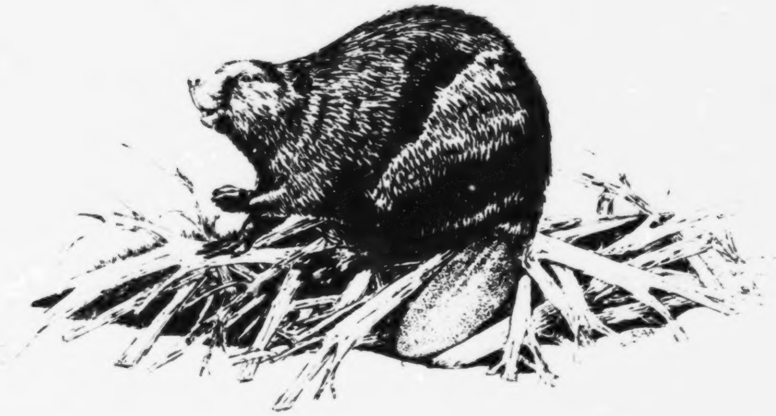
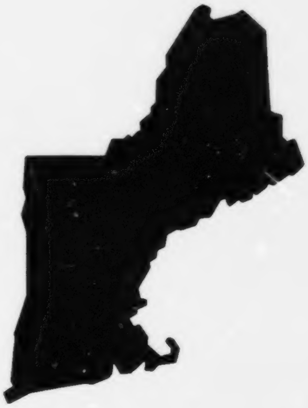
Beaver

(Castor canadensis)





RANGE: Most of North America with the exception of the high arctic, parts of the sw. United States, Florida, and Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Small to large slowly flowing brooks, streams, or rivers that are usually, but not necessarily, bordered by woodland.

SPECIAL HABITAT REQUIREMENTS: Wetlands that provide an adequate food supply and sufficient water depths.

REPRODUCTION: Age at sexual maturity: 1-1/2 to 2 years (Larson 1967). Breeding period: Mid-January to mid-March. Peak: Mid-February. Gestation period: About 106 days. Young born: Mid-May to early June. Litter size: 1 to 9, typically 3 to 5. Litter size may be related to type and amount of available food (Huey 1956). Litters per year: 1.

HOME RANGE: Beavers have been known to range in excess of 450 feet (137 m) from water in search of food (Hiner 1938) but generally remain much closer to lodge.

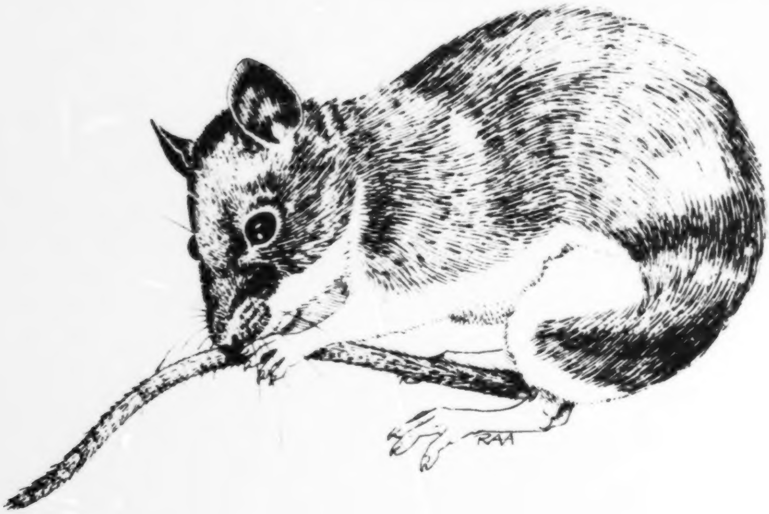
FOOD HABITS: Mainly a nocturnal feeder. Consumes bark of deciduous trees especially aspen, balsam poplar, alder, willow, birch, and maple. Also takes herbaceous vegetation especially aquatics, and some grasses. Caches food under ice for winter use.

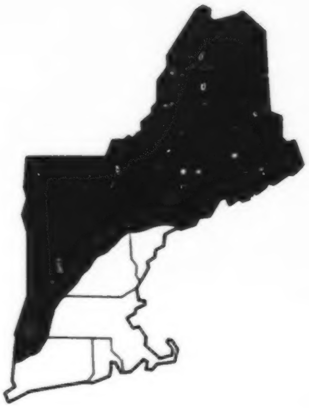
COMMENTS: Monogamous pair bond is life-long. Constructs dams to retain water and large lodge of mud and sticks to enclose den for raising of young and winter shelter or digs burrows in banks.

KEY REFERENCES: Godin 1977, Hodgdon and Larson 1973, Jenkins and Busher 1979.

Deer Mouse

(Peromyscus maniculatus)





RANGE: Most of North America except n. Canada, w. Mexico, the se. United States and the Atlantic Coastal Plain.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Mainly occurs in interiors or along edges of coniferous or mixed forests, along field borders, stone walls, in out-buildings near areas with small trees and dense ground cover (Godin 1977:111). Uses recent forest clearcuts (Kirkland 1977b).

REPRODUCTION: Age at sexual maturity: Females: 40 to 50 days. Males: about 60 days. Breeding period: March through October. Gestation period: About 23 days. Young born: April to October. Litter size: 3 to 7, average 4. Litters per year: 3 or 4.

HOME RANGE: Average 2.3 acres (0.9 ha) for adult males and 1.4 acres (0.6 ha) for adult females in virgin hardwood forest in Michigan (Blair 1942). 0.10 to 0.31 acre (0.04 to 0.13 ha) for adult males and 0.12 to 0.25 acre (0.05 to 0.10 ha) for adult females (Manville 1949).

SAMPLE DENSITIES: Density normally ranges from a low of 1 mouse per 2 acres (1/0.8 ha) in spring to a high of 22 mice per 2 acres (22/0.8 ha) in autumn (Banfield 1974:165).

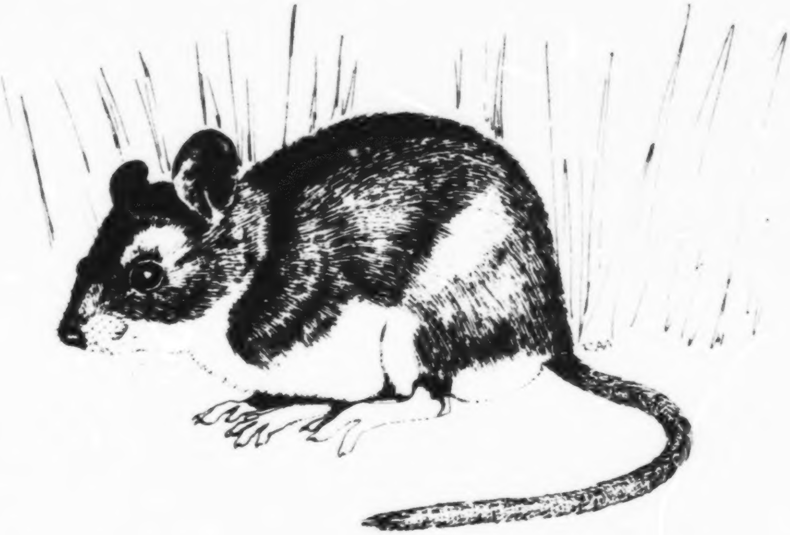
FOOD HABITS: Nuts, seeds, grains, fruits, mushrooms. Also eats small invertebrates such as worms, snails, insect larvae, and occasionally carrion. Caches food in fall for winter use.

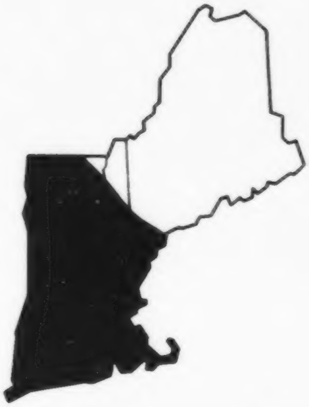
COMMENTS: Nocturnal. Active throughout the year except during severe cold spells or winter storms. Nests in a variety of places including stone walls, buildings, old burrows of small mammals, under logs or in tree cavities.

KEY REFERENCES: Blair 1942, Choate 1873, Godin 1977, King 1968, Klein 1960.

White-footed Mouse

(Peromyscus leucopus)





RANGE: Throughout most of the Eastern United States except n. Maine, n. Minnesota, n. Wisconsin, Florida and coastal sections of the se. United States. Does not occur w. of Arizona and Montana.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Interiors and edges of deciduous, mixed, and coniferous forests from sea level to above treeline. Clearcuts, brushy woodland clearing, pastures, streamside thickets, buildings.

REPRODUCTION: Age at sexual maturity: 6 to 7 weeks. Breeding period: Late February to November. Gestation period: 22 to 25 days. Young born: March to December. Litter size: 1 to 7, typically 3 to 4.

HOME RANGE: Sizes ranged from 0.16 to 0.54 acre (0.06 to 0.22 ha) for adult males and 0.06 to 0.36 acre (0.02 to 0.15 ha) for adult females in mature oak-hickory in southern Michigan (Burt 1940).

FOOD HABITS: Seeds, acorns, nuts, fruits, tender green plants, insects, and small amounts of meat (carrion). Commonly stores food for future use.

COMMENTS: Nests in a variety of places including stone walls, tree cavities, under stumps or logs or in buildings. Nocturnal and active in all seasons.

KEY REFERENCES: Burt 1940, King 1968, Snyder 1956, Svihla 1932.

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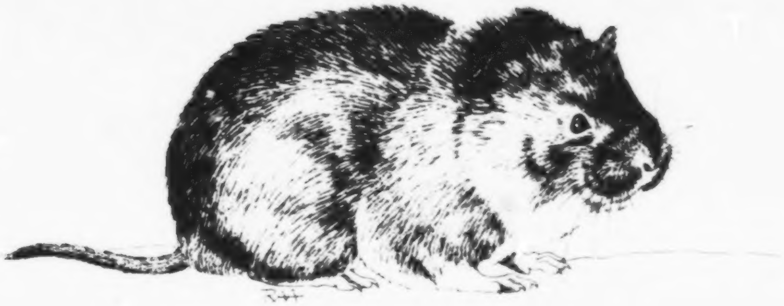
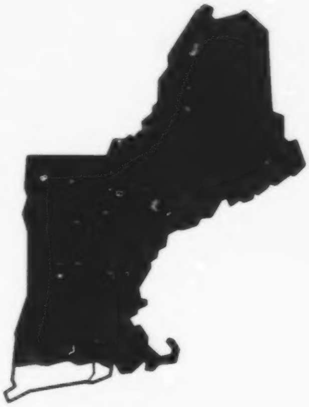
Southern Red-backed Vole

(Clethrionomys gapperi)





RANGE: Canadian Provinces s. in the United States in the Appalachians to n. Georgia and in the Rockies to sw. New Mexico. Also occurs in the n. border states.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Cool moist deciduous, mixed, or coniferous forests among mossy rocks, logs, tree roots, or other cover. Less commonly found near stone walls at woodland edges or near talus slopes. Favors damp situations in coniferous or mixed woods. Highest densities found in subclimax communities (Cameron 1958:46). Uses young clearcuts in deciduous or coniferous woodlands (Kirkland 1978) and mixed forest (Lovejoy 1975).

SPECIAL HABITAT REQUIREMENTS: Water sources such as springs, brooks or bogs, debris cover (fallen trees, stumps, rocks, slash).

REPRODUCTION: Age at sexual maturity: Possibly 3 or 4 months (Blair 1941:683). Breeding period: Mid-January to late November. Peak: February to October. Gestation period: 17 to 19 days. Young born: February to December. Litter size: 1 to 8, typically 4 to 6. Litters per year: Probably 2 or more.

HOME RANGE: About 0.25 acre (0.10 ha) (Burt and Grossenheider 1976:182); about 0.57 acre (0.23 ha) for 1 female, and 3.56 acres (1.44 ha) for 1 male in virgin hardwood forest in northern Michigan (Blair 1941).

FOOD HABITS: Mainly green vegetation but also eats seeds, nuts, fungi, bark, insects, and carrion.

COMMENTS: Mainly nocturnal, active year long. Commonly uses burrow systems of moles or other mammals. Nests under logs, stumps, roots, or snow (winter).

KEY REFERENCES: Criddle 1932; Miller and Getz 1972, 1973; Svihla 1930.

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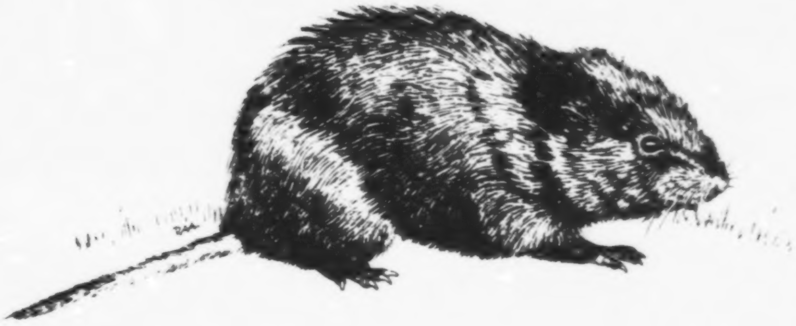
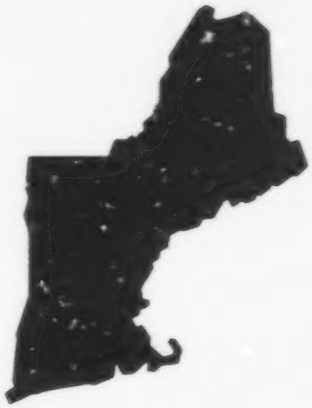
Meadow Vole

(Microtus pennsylvanicus)





RANGE: Southern two-thirds of Canada and s. Alaska, s. to Washington, n. New Mexico, Missouri and n. Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Fields, pastures, orchards, freshwater and salt water marshes and meadows, borders of streams and lakes, open and wooded swamps, bogs; less commonly in open woods and clearcuts.

SPECIAL HABITAT REQUIREMENTS: Herbaceous vegetation, loose organic soils.

REPRODUCTION: Age at sexual maturity: Females: about 25 days. Males: about 45 days. Breeding period: Throughout the year, if snow provides insulating cover. Peak: April to October. Gestation period: About 21 days. Young born: Throughout the year. Litter size: 1 to 9, typically 4 or 5. Litters per year: May produce 5 to 10. Known to produce 17 (Hamilton 1941).

HOME RANGE: Seldom exceeded 0.06 acre (0.02 ha) in New York in good habitat (Hamilton 1937). Sizes may vary range from 0.08 to 0.23 acre (0.03 to 0.09 ha) (Banfield 1974). Defensive behavior displayed during male encounters may indicate that they defend territories (Getz 1961b).

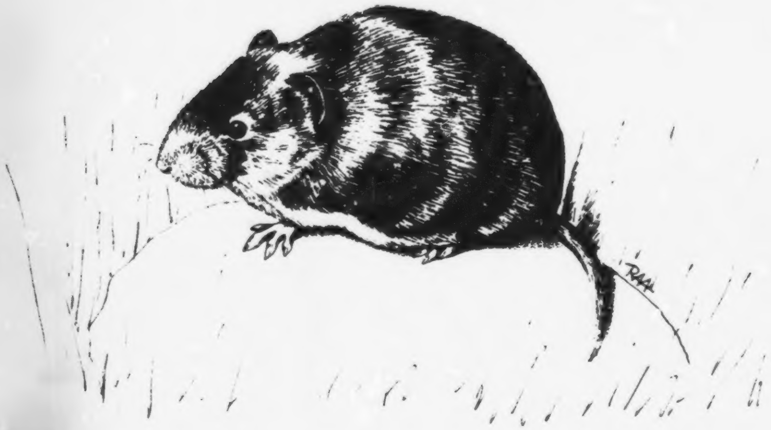
FOOD HABITS: Eats mainly vegetable material especially tender grasses, bulbs, cambium of roots and stems, seeds, and grains. Occasionally caches food when supply is abundant and takes small amounts of meat when available.

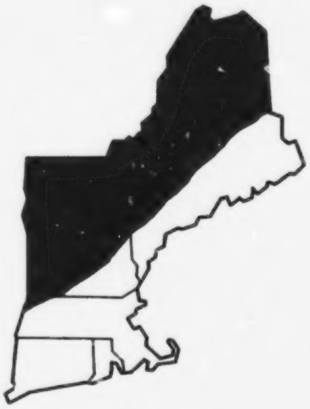
COMMENTS: Active day and night throughout the year. Builds extensive tunnel and runway systems. Nests under boards, rocks, logs, and in other sheltered spots including tunnels. May damage nursery and orchard stock. There is a cyclic fluctuation in populations of about 4 years (Hamilton 1937). The beach vole, found only on Muskeget Island, Massachusetts, is here considered the meadow vole. Burt and Grossenheider (1976:183) indicated that it may be a separate species, *M. breweri*; Godin (1977:124) gives the beach vole species status.

KEY REFERENCES: Bailey 1924, Blair 1940b, Getz 1961b, Hamilton 1937.

Rock Vole

(Microtus chrotorrhinus)





RANGE: Cape Breton Island and e. Quebec w. to ne. Minnesota. The mountains of n. New England, s. in the Appalachians to North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Unknown, possibly rare, but may be locally common in appropriate habitat.

HABITAT: Coniferous and mixed forests at higher elevations. Favors cool, damp, moss-covered rocks and talus slopes in vicinity of streams. Kirkland (1977a) captured rock voles in clearcuts in West Virginia, habitat not previously reported for this species. Timm and others (1977) found voles using edge between boulder field and mature forest in Minnesota. They have been taken at a new low elevation (1,509 feet, 460 m) in the Adirondacks (Kirkland and Knipe 1979).

SPECIAL HABITAT REQUIREMENTS: Cool, moist, rocky woodlands with herbaceous groundcover and flowing water.

REPRODUCTION: Age at sexual maturity: Females and males are mature when body length exceeds 140 mm and 150 mm, respectively, and total body weight exceeds 30 g for both sexes (Martin 1971). Females born in late spring produce litters in first summer (Timm et al. 1977). Breeding period: Late March to mid-October (Martin 1971). Gestation period: Unknown. Young born: Early spring to fall; peak: June. Litter size: 1 to 7, typically 3 or 4. Litters per year: Up to 3.

HOME RANGE: Unknown.

FOOD HABITS: Bunchberry, wavy-leafed thread moss, blackberry seeds (Martin 1971). May browse on blueberry bushes (twigs and leaves), mushrooms, and Clinton's lily. A captive subadult ate insects (Timm et al. 1977). Seems to be diurnal with greatest feeding activity taking place in morning (Martin 1971). Less active in afternoon in northern Minnesota (Timm et al. 1977).

COMMENTS: Occurs locally in small colonies throughout its range. Natural history information is lacking for this species. Habitat preferences seem to vary geographically.

KEY REFERENCES: Banfield 1974, Burt 1957, Kirkland 1977a, Martin 1971, Timm et al. 1977.

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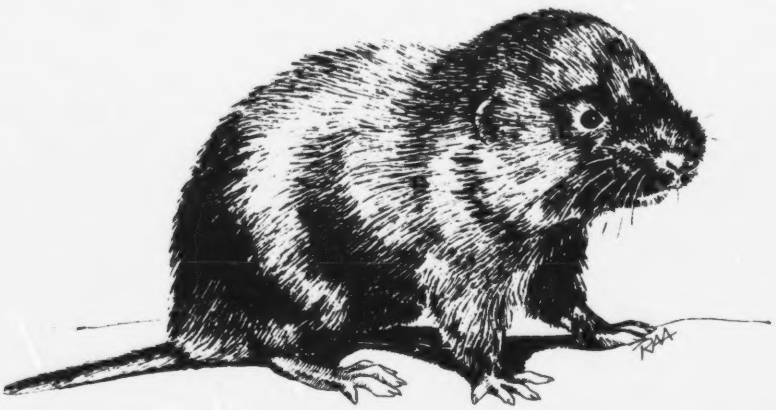
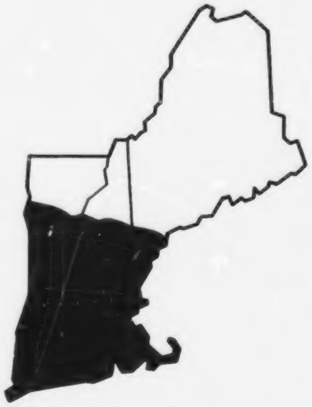
Woodland Vole

(Microtus pinetorum)





RANGE: Northcentral New England, w. to c. Wisconsin s. to e. Texas and n. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Deciduous forests, grasslands, meadows, and orchards. Occurs in marshes and swamps but favors well-drained uplands.

SPECIAL HABITAT REQUIREMENTS: May require groundcover of leaves (duff) or grass; moist well-drained soils.

REPRODUCTION: Age at sexual maturity: 2 months (Hamilton 1938). Breeding period: Mid-February to mid-November. Gestation period: About 24 days. Young born: Early March to early December. Litter size: 2 to 4.

HOME RANGE: About 0.25 acre (0.10 ha) in oak-hickory woods in Michigan (Burt 1940). Home ranges of voles in Connecticut had average maximum diameters of 30.7 yards (33.7 m) for females and 30 yards (32.7 m) for males (Miller and Getz 1969).

SAMPLE DENSITIES: Densities ranged from 0 to 6 individuals per acre (0 to 14.6/ha) in upland oak woods (Miller and Getz 1969).

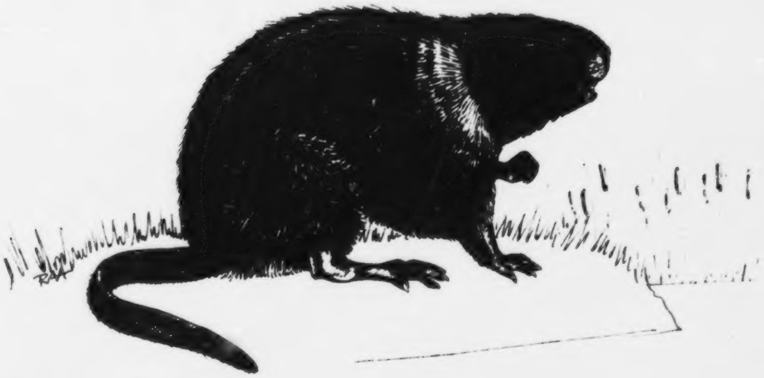
FOOD HABITS: Subterranean tubers, roots and bulbs; seeds, nuts, fruits, bark, and leaves. Often caches large amounts of food in burrows.

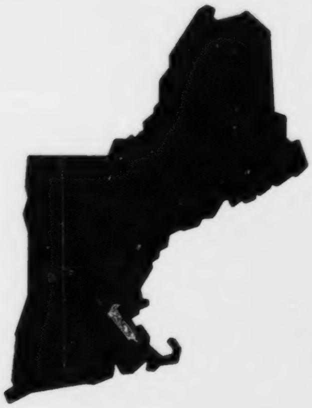
COMMENTS: Highly fossorial spending much time digging tunnel systems and foraging below ground. Tunnels may be dug as deep as 12 inches (30.5 cm) but are generally 3 or 4 inches (7 to 10 cm) below ground surface. Nests are built under logs or rocks or in burrows well below ground. Active throughout the year. May be a severe pest species in nurseries and orchards in the Northeast. Also called the pine vole.

KEY REFERENCES: Benton 1955, Burt 1940, Hamilton 1938, Miller and Getz 1969.

Muskrat

(Ondatra zibethicus)





RANGE: Throughout most of Canada except portions directly e. and nw. of Hudson Bay. In most of the United States except parts of California, Texas, South Carolina, Georgia, and all of Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Marshes, shallow portions of lakes, ponds, swamps, sluggish streams, drainage ditches. Most abundant in areas with cattails.

SPECIAL HABITAT REQUIREMENTS: Wetlands with dense emergent vegetation and stable water levels.

REPRODUCTION: Age at sexual maturity: Possibly 6 months, and perhaps as early as 4 months (H. Smith, personal communication). Breeding period: Late February to August (H. Smith, personal communication). Mid-March to September (Chamberlain 1951) in Massachusetts. Gestation period: 28 or 30 days (Godin 1977:133). Young born: April or May and June or July; September and early October litters have been observed (H. Smith, personal communication). Litter size: 1 to 8, typically 5 or 6. Litters per year: Average 3 (H. Smith, personal communication). Litter size positively correlates with latitude while number of litters per year is inversely related (Boyce 1977 cited in Perry 1982).

HOME RANGE: Usually within 200 yards (182 m) of den (Errington and Errington 1937). Territorial. Females with young will defend nest site. Most foraging within 15 meters (50 ft.) of the primary lodge and few movements exceeded 150 meters (500 ft.) (MacArthur 1978).

FOOD HABITS: A variety of aquatic plants especially cattails, reeds, pondweeds, bulrushes, and water lilies, fresh water clams, and other small aquatic animals. Builds roofed feeding platforms near house.

COMMENTS: May construct a dome-shaped chamber of weeds over water (less than 2 feet (0.6 m) deep) for nest or may dig a den in stream or ditch bank. Mainly nocturnal but often seen in daylight. Active throughout the year. Populations tend to follow a 10-year cycle (Elton and Nicholson 1942).

KEY REFERENCES: Errington 1961, 1963; Godin 1977; Johnson 1925; Shanks and Arthur 1952.

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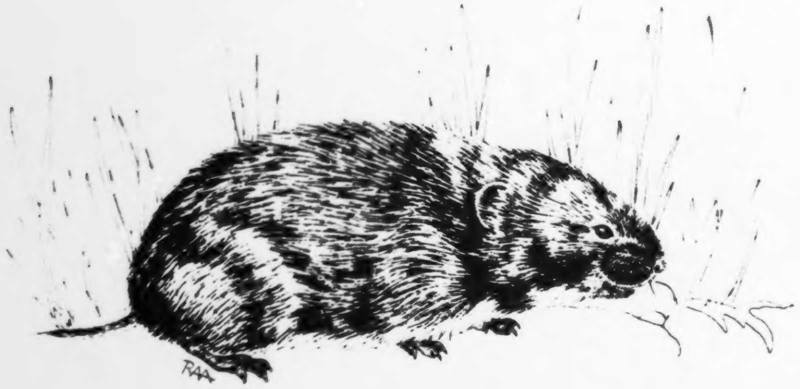
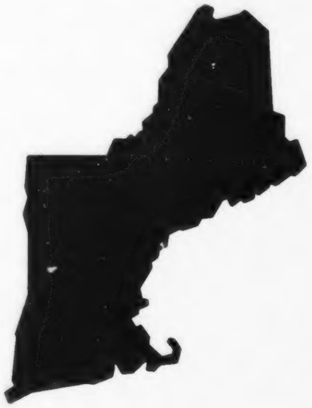
Southern Bog Lemming

(Synaptomys cooperi)





RANGE: Quebec w. to Manitoba, s. to Kansas, Arkansas, Virginia, and Maryland.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon, in very scattered colonies.

HABITAT: Uses a variety of habitat including marshes, open meadows and orchards, moist deciduous and mixed forests. Favors sphagnum bogs and deciduous woodlands with a thick layer of loose duff. Uses clearcuts and other small forest openings with adequate groundcover (Kirkland 1977b, McKeever 1952).

SPECIAL HABITAT REQUIREMENTS: Moist soils.

REPRODUCTION: Age at sexual maturity: Unknown. Breeding period: Throughout the year. Peak: April to September. Gestation period: 21 to 23 days. Young born: Throughout the year; most young are born between May and September. In New Jersey, females produced a litter every 67 days (average) in spring and summer (Conner 1959). Litter size: 1 to 8, typically 2 to 5.

HOME RANGE: 1 acre (0.40 ha) for 1 individual in sphagnum bog with tamarack and black spruce forming a dense canopy (Buckner 1957). 0.20 to 0.50 acre (0.08 to 0.20 ha) (Banfield 1974:188). Females defend nest.

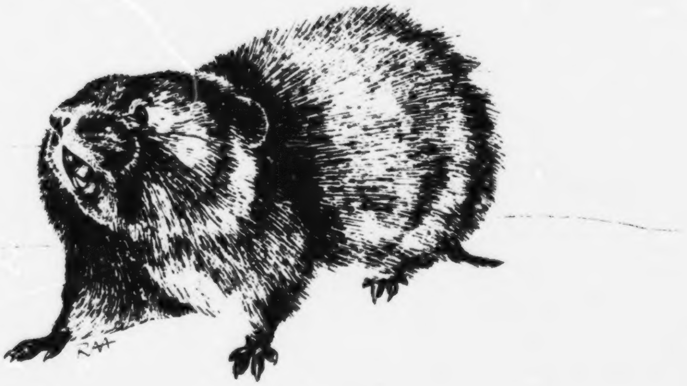
FOOD HABITS: Tender parts of herbaceous plants, especially leaves, stems and seeds of grasses and sedges, fruits. Occasionally takes fungi, bark, and insects.

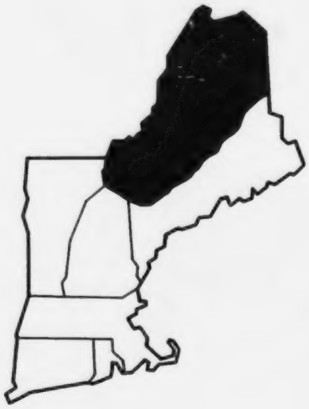
COMMENTS: Tunnel systems are deep, 6 to 12 inches (15 to 30 cm) below ground and complex with many side chambers for resting, feeding, and storing of food. Surface runways serve as travel lanes. Winter nest may be located in burrow, summer nest may be on surface in tuft of grass. Active during the day and night at all seasons of the year. Life history is poorly known.

KEY REFERENCES: Buckner 1957, Conner 1959, Godin 1977.

Northern Bog Lemming

(Synaptomys borealis)





RANGE: Labrador w. to c. Alaska, s. to Washington, se. Manitoba and n. New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and local.

HABITAT: Sphagnum bogs, damp weedy meadows, mossy spruce woods, hemlock and beech forests.

SPECIAL HABITAT REQUIREMENTS: Moist to wet loose soils or leaf mold.

REPRODUCTION: Age at sexual maturity: Unknown. Breeding period: Unknown. Gestation period: Unknown. Young born: May to August. Litter size: 4 to 8, typically 4.

HOME RANGE: Unknown.

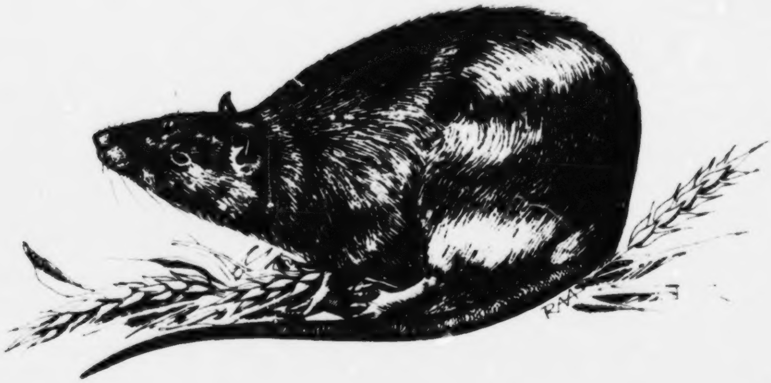
FOOD HABITS: Succulent parts of grasses and sedges, seeds, fungi.

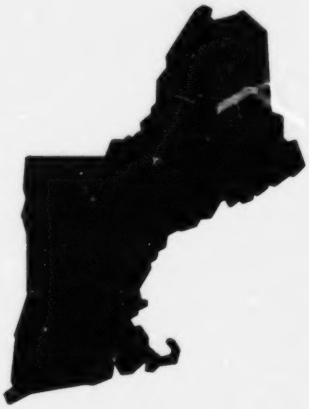
COMMENTS: Uses burrows several inches below ground and shallow runways on surface. This species' life history is poorly known. Two reported New England specimens are from Mt. Katahdin, Maine, and Fabyans at the base of Mt. Washington, New Hampshire (Godin 1977: 136). T. French (personal communication) reported a third record from Mt. Moosilauke, New Hampshire.

KEY REFERENCES: Banfield 1974, Godin 1977.

Norway Rat

(Rattus norvegicus)





RANGE: Throughout most of North America with numbers varying with climate and habitat.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Concentrates in areas where food is abundant such as waterfronts, farms, cities, and dumps. They may also inhabit rural and suburban residences.

SPECIAL HABITAT REQUIREMENTS: Buildings, dumps, or loose soil for digging burrows near food supply.

REPRODUCTION: Age at sexual maturity: 80 to 85 days. Breeding period: Throughout the year. Peaks: Spring and autumn. Gestation period: 21 to 22 days. Young born: In all seasons of year. Litter size: 2 to 14, average 9. Litters per year: 3 to 12, average 6.

HOME RANGE: About 25 to 50 yards (23 to 46 m) in diameter (Banfield 1974: 222). Movements were confined to an area 100 to 150 feet (30 to 46 m) in diameter both in residential and farm areas (Davis 1953).

FOOD HABITS: Omnivorous, taking fruits, vegetables, grains, carrion and fresh meats, garbage.

COMMENTS: Colonial and closely associated with man. Probably the most economically important of the rodents because of the damage they cause to buildings and the diseases they spread to humans. Active mainly at night throughout the year. May dig extensive burrow systems for nesting and escaping predators.

KEY REFERENCES: Calhoun 1962, Davis 1953.

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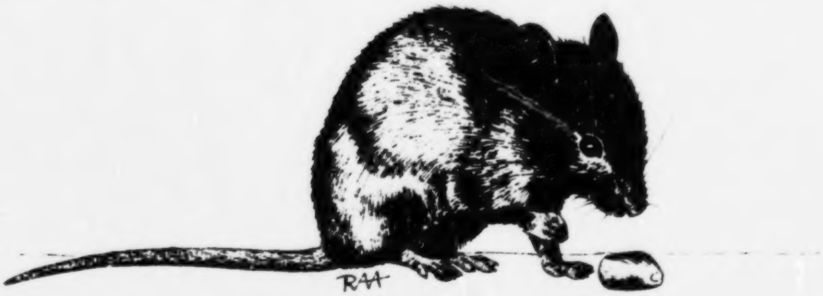
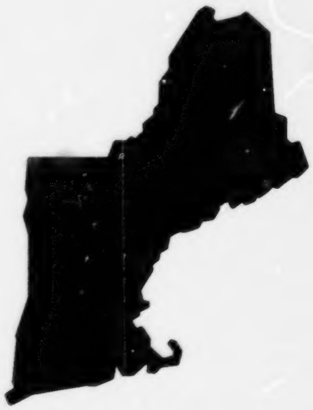
House Mouse

(Mus musculus)





RANGE: Throughout North America from s. Canada to Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Buildings, fields, corncribs, and so on. Often burrows in fields and uses existing mouse runways during warm seasons of year and moves indoors to escape winter cold.

SPECIAL HABITAT REQUIREMENTS: Buildings in winter.

REPRODUCTION: Age at sexual maturity: 8 weeks (females) (Godin 1977:142), 5 weeks (Banfield 1974:224). Breeding period: Throughout the year. Peak: Early spring to late summer. Gestation period: 19 to 21 days. Young born: Throughout the year. Litter size: 3 to 12, typically 4 or 5. Litters per year: 5 to 8, typically 6.

HOME RANGE: Average 1,560 square feet (145 m^2) for males and females (Lidicker 1966) in brush-grass habitat (on an island) with high population of *Microtus*. 3,925 square feet (365 m^2) in area with low (1 individual) *Microtus* population (Quadagno 1968).

SAMPLE DENSITIES: Densities of 300 or more mice per acre (741 + /ha) were reported on an island (Lidicker 1966).

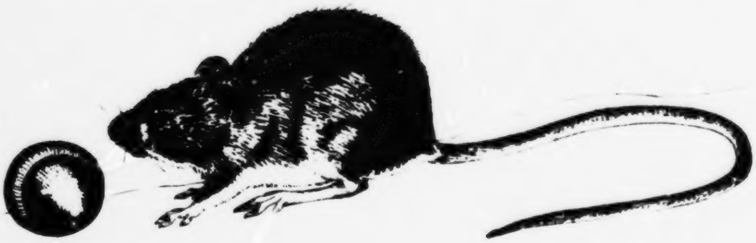
FOOD HABITS: Fruits, grains, seeds, vegetables, plant roots, insects, almost any sweet or high protein food. Occasionally caches food.

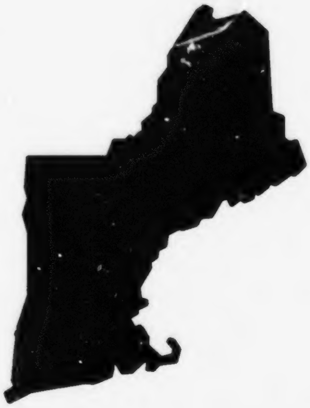
COMMENTS: Mainly nocturnal, active throughout the year. Colonial and highly social—may construct communal nests.

KEY REFERENCES: Godin 1977, Lidicker 1966, Quadagno 1968.

Meadow Jumping Mouse

(Zapus hudsonius)





RANGE: Most of Canada, Alaska and the continental United States, s. to n. Georgia and w. to Colorado.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Moist, open grassy and brushy marshes and meadows, willow-alder thickets occurring along water courses, swamps and transition areas between lowlands and wooded uplands and mixed), occasionally dry meadows. Seems to prefer areas with numerous shrubs and small trees.

SPECIAL HABITAT REQUIREMENTS: Herbaceous groundcover, loose soils for burrowing.

REPRODUCTION: Age at sexual maturity: Less than 1 year. Young females of first litter may breed during first year (Quimby 1951). Breeding period: Late April to early September. Peaks: Early June, July, and August (Hamilton and Whitaker 1979:248). Gestation period: 18 days. Young born: May to early October. Litter size: 2 to 8, average 5 to 6. Litters per year: 2 possibly 3.

HOME RANGE: Average 0.38 acre (0.15 ha) for females and average 0.43 acre (0.17 ha) for males in Itasca Park in Minnesota (Quimby 1951). Approximately 0.89 acre (0.36 ha) (average) for males and 0.92 acre (0.37 ha) (average) for females in grassy area in Michigan (Blair 1940c).

FOOD HABITS: Invertebrates, especially beetles and cutworms are taken in spring followed by seeds, fruits, nuts, and subterranean fungi as summer progresses. Feeds on rootlets exposed by stream erosion (Cameron 1958:49).

COMMENTS: Mainly nocturnal and solitary. Hibernates for longer periods in winter than most mammals (Godin 1977:144) in chambers 1 to 3 feet below ground, usually in a bank or hill (Banfield 1974:227).

KEY REFERENCES: Blair 1940c; Quimby 1951; Sheldon 1934; Whitaker 1963a, 1972b.

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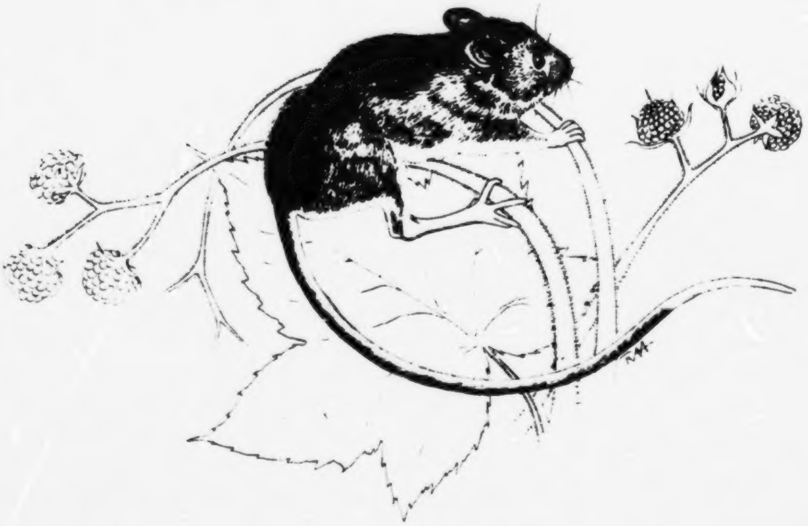
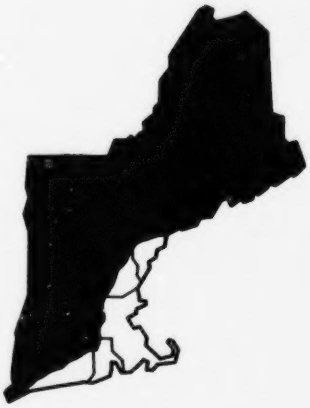
Woodland Jumping Mouse

(Napaeozapus insignis)





RANGE: Canadian maritime provinces s. to n. New Jersey and w. Maryland w. to ne. Ohio.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Areas with herbaceous groundcover and low woody plants in both deciduous and coniferous forests, frequently in brush and herbaceous vegetation bordering streams, lakes, or ponds. Uses recent clearcuts with herbaceous cover (Kirkland 1977b). Seldom ventures into bare open areas.

SPECIAL HABITAT REQUIREMENTS: Moist cool woodland, loose soils for burrowing, herbaceous cover (Whitaker and Wrigley 1972).

REPRODUCTION: Age at sexual maturity: Possibly as early as 38 days (Layne and Hamilton 1954). Breeding period: May to August. Gestation period: 21 to 25 days. Young born: Late May to late August. Occasionally a second litter born in September (Godin 1977:148). Litter size: 1 to 8, typically 5. Litters per year: 1 or 2.

HOME RANGE: Average 8.96 acres (3.63 ha) for an adult male and 6.55 acres (2.65 ha) for an adult female (Banfield 1974:230). 1.0 to 6.5 acres (0.40 to 2.63 ha) for females and 1.0 to 9.0 acres (0.40 to 3.64 ha) for males in virgin hardwood forest in Michigan (Blair 1941).

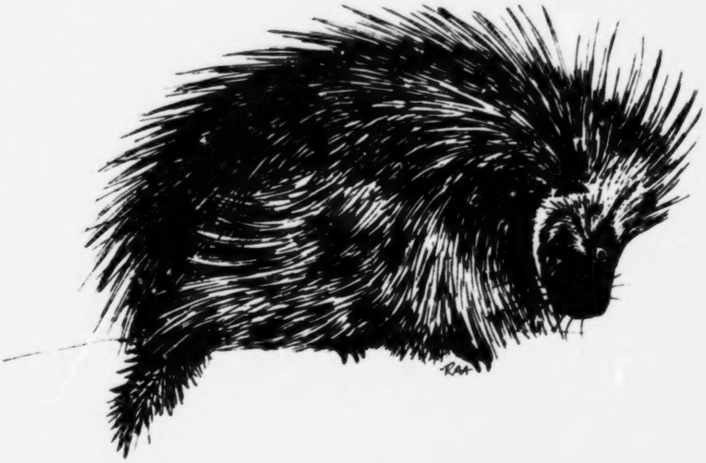
FOOD HABITS: Tender parts of herbaceous plants, roots, fruits, underground fungi, seeds, insect larvae and adults. Does not cache food.

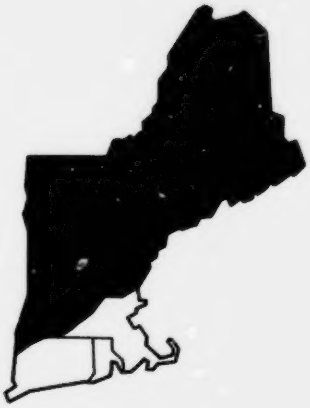
COMMENTS: Nocturnal feeder, hibernates from October or November until April or May. Nest may be built in excavated chamber within burrow system usually about 4 inches (10 cm) below the surface of ground or under log or stump.

KEY REFERENCES: Blair 1941; Brower and Cade 1966; Hamilton 1935; Lovejoy 1973; Preble 1956; Sheldon 1934, 1938; Whitaker 1963b, Wrigley 1972.

Porcupine

(Erethizon dorsatum)





RANGE: Nova Scotia and Quebec w. across boreal Canada to Alaska, s. in the Appalachian to n. Virginia; in the Midwest to n. Minnesota and Wisconsin, and in the West to nw. Texas, Arizona, and e. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Mixed or coniferous forests especially northern hardwood-hemlock, with adequate denning sites. Not restricted to any plant or edaphic community (Dodge 1982).

SPECIAL HABITAT REQUIREMENTS: Den sites in rock ledges, trees or other protected places.

REPRODUCTION: Age at sexual maturity: 15 to 16 months. Breeding period: October through December, occasionally later. Gestation period: 205 to 217 days, average 210 days (Shadle 1951). Young born: April to June. Litter size: 1, rarely more. Litters per year: 1.

HOME RANGE: Winter ranges averaged 6 acres (2.4 ha) in New Hampshire (Faulkner and Dodge 1962) and 13.3 acres (5.4 ha) in the Adirondacks of New York (Shapiro 1949). Spring and summer ranges ranged from 32 to 36 acres (13.0 to 14.6 ha) in conifer-hardwood forest in Minnesota (Marshall et al. 1962). Varies with climate and habitat (Dodge 1982).

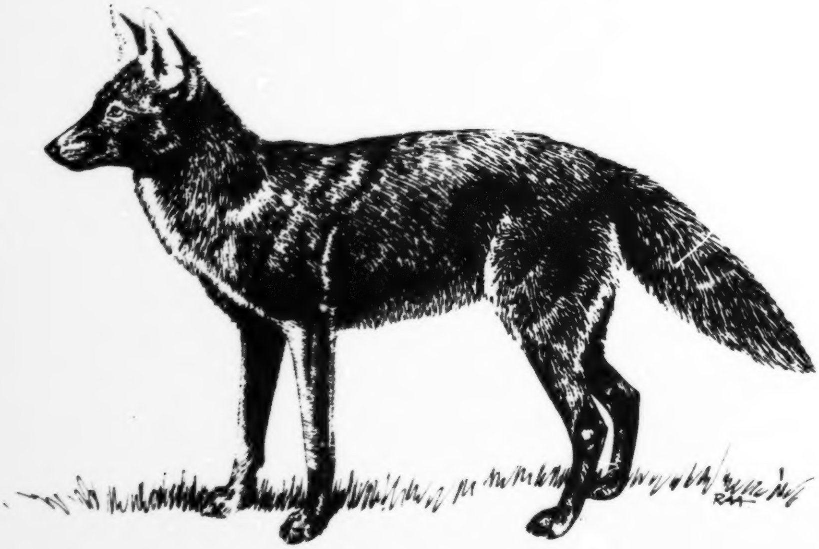
FOOD HABITS: Herbaceous and woody vegetation. Eats large quantities of grasses, leaves, twigs, buds, mast, and bark. Hemlock is a major winter food in the Northeast (Dodge 1967).

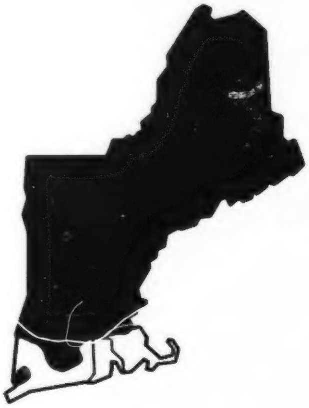
COMMENTS: Mainly nocturnal, remaining active throughout the year. Den may be in rocky cavern of ledge, in hollow log, abandoned building, or abandoned fox or beaver den; winter denning may be in groups (Dodge 1982). Generally is solitary throughout the year, may spend the winter in a "station tree," usually a hemlock or white spruce. May damage commercially grown trees or buildings.

KEY REFERENCES: Costello 1966, Curtis and Kozicky 1944, Dodge 1967, Shapiro 1949.

Coyote

(Canis latrans)





RANGE: New England (except Rhode Island), New York, n. Pennsylvania, n. Ohio, s. to Texas and w. to California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to common.

HABITAT: Edges of second growth forests, open brushy fields, fallow agricultural land, forest openings created by fire or logging.

WINTER HABITAT: Coyotes may concentrate in low-lying areas with abundant snowshoe hares and deer (Ozoga and Harger 1966).

SPECIAL HABITAT REQUIREMENTS: Open or semiopen country for hunting, secluded den sites.

REPRODUCTION: Age at sexual maturity: 1 to 2 years. Breeding period: February (in northern part of range). Gestation period: 60 to 65 days. Young born: April or May. Litter size: 4 to 8, occasionally more, typically 5 to 7.

HOME RANGE: Size may exceed an area 5 miles (8 km) in diameter depending on food supply and time of year (Godin 1977). Range sizes of radio-tracked individuals were greater for males (average 26.3 mi^2, 68 km^2) than females (6.3 mi^2, 16 km^2) in Minnesota (Berg and Chesness 1978). Pack animals defend well-defined territories, pairs and solitary individuals do not (Bekoff and Wells 1980).

SAMPLE DENSITIES: The winter density of coyotes on an island in Lake Michigan was estimated at 1 animal per 2 square miles (5.2 km^2) (Ozoga and Harger 1966).

FOOD HABITS: Opportunistic feeders consuming mainly carrion, small live vertebrates, invertebrates, and vegetation. Winter food in the Northeast is mainly snowshoe hare and carrion of deer.

COMMENTS: Mainly crepuscular and nocturnal, hunting alone or in small packs. Den is usually in an excavated burrow that is well hidden by vegetation, a rock, or stump. Dens of other animals frequently used (Bekoff 1982). Several dens may be used by families while pups are less than 10 weeks of age (Harrison and Harrison 1983).

KEY REFERENCES: Banfield 1974; Bekoff 1977, 1978; Hilton 1978; Ozoga and Harger 1966; Stebler 1951.

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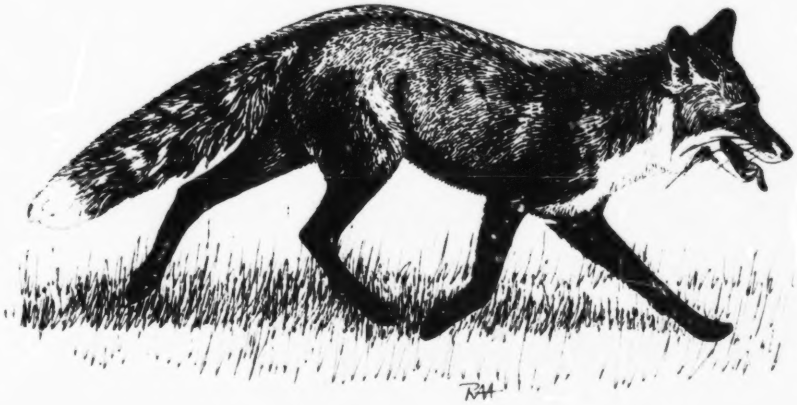
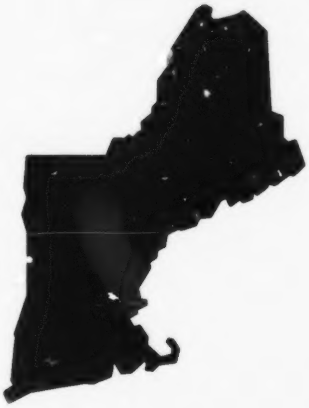
Red Fox

(Vulpes vulpes)





RANGE: North America from Baffin Island s. to c. Texas, excluding se. United States, the West Coast from Canada to California, the sw. desert, and the Great Plains.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Found in a variety of habitats. A mixture of forest and open areas is preferred. Unbroken fields and dense forests avoided. Edges used heavily (Ables 1974).

SPECIAL HABITAT REQUIREMENTS: Suitable den sites.

REPRODUCTION: Age at sexual maturity: Winter after birth. Breeding period: mid-January to late February, sometimes extending to March. Peak: Late January. Gestation period: 51 to 56 days, average 53 days. Young born: March or April. Litter size: 1 to 10, average 4 or 5.

HOME RANGE: Less than 3 miles (4.8 km) in diameter (Ables 1969, Sargeant 1972, Scott 1943, Storm 1965). Phillips and others (1972) found that 70 percent of the juvenile males on study areas in Iowa and Illinois and 30 percent of the females moved more than 5 miles (8 km) from their natal ranges during their first year. Distances of 15 to 20 miles (24 to 32km) were common. Home range is shared by a male-female pair and seasonally by their pups (Sargeant 1972, Scott 1943). Seven foxes collared in Wisconsin had home ranges from 57.5 to 161.9 ha (142 to 400 acres) (Ables 1969).

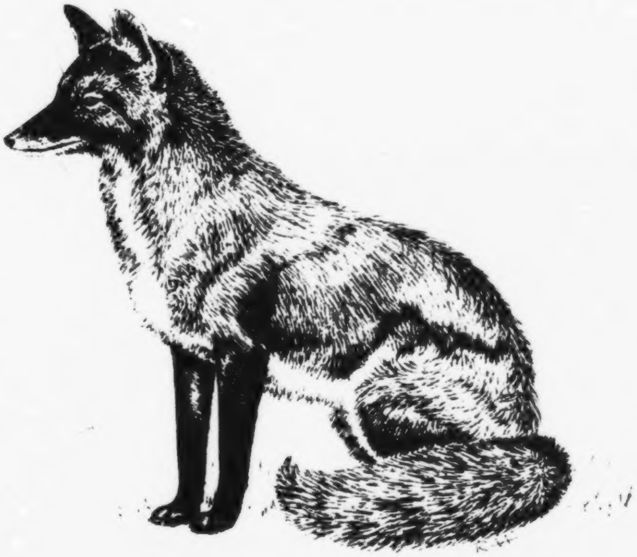
FOOD HABITS: Opportunistic feeder consuming animals ranging from insects to small mammals. Commonly takes birds, turtles, frogs, snakes and their eggs. Berries and fruits are eaten when available. Surplus food may be buried or cached under snow and marked with urine. In eastern Maine, Halpin (1983) found snowshoe hare was the most abundant winter food item in a diet that also included deer and porcupine.

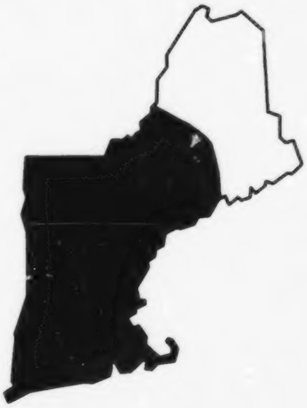
COMMENTS: May dig dens but prefers to use existing burrows for rearing young and escaping predators. Red fox dens may have an underground tunnel system 25 feet (8 m) long or more (Godin 1977:203).

KEY REFERENCES: Godin 1977, Seagears 1944, Seton 1929.

Gray Fox

(Urocyon cinereoargenteus)





RANGE: Throughout the United States except Idaho, Montana, Wyoming, most of Washington, and the w. plains s. toTexas. Recently extended n. to se. Canada.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon. Presently is reoccupying range in New England.

HABITAT: Dense northern hardwood or mixed forests. May inhabit thickets and swamps. Prefers a mixture of fields and woods (Wood 1958).

SPECIAL HABITAT REQUIREMENTS: Den sites such as hollow logs, tree cavities, rock crevices, or cavities beneath deserted buildings, rarely in ground burrows.

REPRODUCTION: Age at sexual maturity: First year after birth. Breeding period: Mid-January to May. Peak: Early March (latitude-dependent). Gestation period: 51 to 63 days, average 53 days. Young born: March or April. Litter size: 2 to 7 pups, average 3 to 5 (Wood 1958).

HOME RANGE: Varies with food supply, disturbances, denning, and season. Range varies from a mile (1.6 km) wide during denning to 5 miles (8 km) in the fall (Godin 1977:206). Yearsley and Samuel (1980) found home ranges from 75 to 185 ha (185 to 457 acres).

FOOD HABITS: Crepuscular and nocturnal. Chiefly small mammals, particularly cottontails, but includes birds, reptiles and amphibians and their eggs. Acorns, insects, fruits, and carrion are also eaten.

COMMENTS: Hunts prey and escapes enemies by climbing trees. The northward spread corresponds to that of the cottontail.

KEY REFERENCES: Burt and Grossenheider 1976, Godin 1977, Sullivan 1956.

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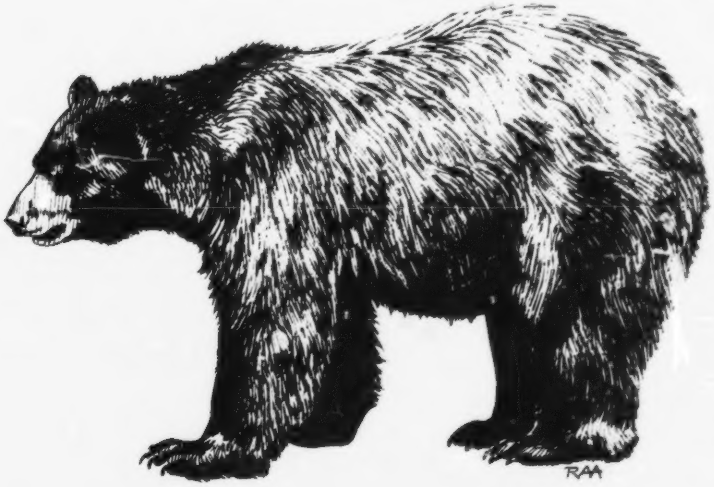
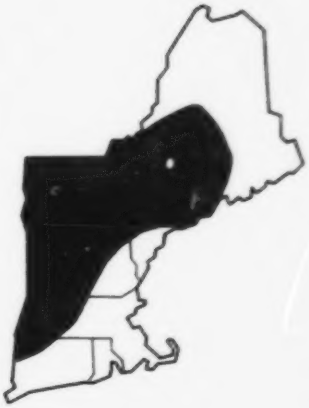
Black Bear

(Ursus americanus)





RANGE: Throughout Canada except the n. coast. In the United States it occurs in the Sierras, Idaho, and Montana, s. through the Rockies into Mexico, n. Great Lakes area, Ozarks, Gulf Coast, Florida, and New England s. through the Appalachians to n. Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in north to uncommon farther south. Increasingly reported from nw. New Jersey (R. Lund, personal communication.).

HABITAT: Primarily in fairly remote forests and swamps. Prefers mixed deciduous-coniferous woodlands with a thick understory. Requires abundant sources of hard or soft mast within its habitat (Pelton 1982).

SPECIAL HABITAT REQUIREMENTS: Den sites located under fallen trees, in hollow logs, rock ledges, slash piles, or other protected areas.

REPRODUCTION: Age at sexual maturity: Females: 3-1/2 years to 5 years (Pelton 1982). Breeding period: Early June through mid-July. Peak: mid-June. Gestation period: 7 to 8 months, average 220 days. Young born: Mid-January in Pennsylvania (Alt 1981) to February. Litter size: 1 to 5, average 2 (varies with year and locality, females breed once every 2 years).

HOME RANGE: Home range size varies with many factors and is presently unknown. There is probably a greater seasonal range in the male black bear than the female (Godin 1977:209). Most widely accepted range is a 15-mile (24 km) average radius for adult males and a somewhat smaller radius for females (Cahalane 1947).

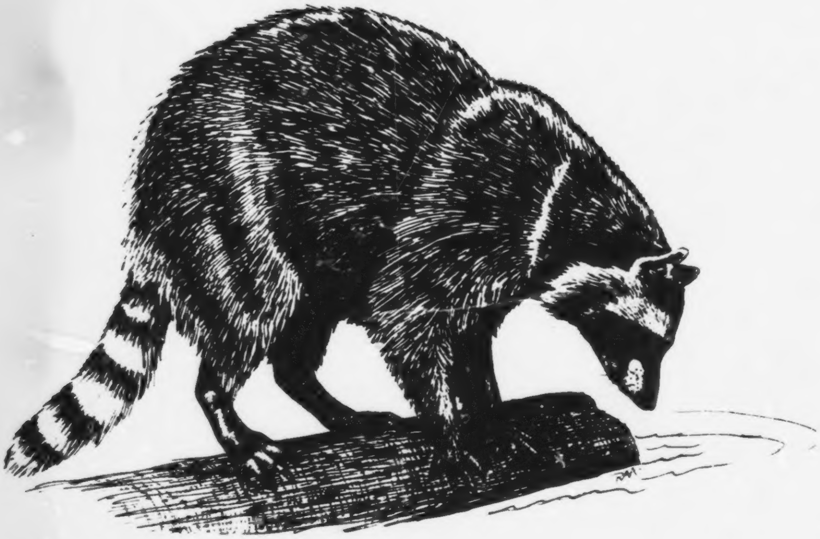
FOOD HABITS: Plant material is the major food; forbs and grasses eaten in spring, soft mast (fruit) in summer, and hard and soft mass in fall (Pelson 1982). Omnivorous feeder consuming insects, especially grubs and ants under the bark of rotten logs and stumps, mice, frogs, fish acorns and beechnuts, apples and numerous berries. Also takes carrion and garbage.

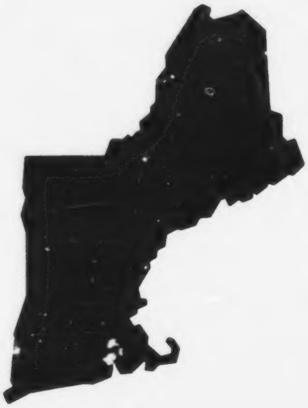
COMMENTS: Nocturnal. Trails are used repeatedly and prominent trees are often marked by either sex by clawing and ripping off bark. Several individuals may mark the same tree. Usually solitary except mother and cubs. Cubs are born during the winter while the female is in the den. At birth they weigh less than 1 pound (448 g) and are poorly developed. Females are inactive (semi-hibernate) during the coldest months of the year.

KEY REFERENCES: Banfield 1974, Burt and Grossenheider 1976, Cardoza 1976, Godin 1977, Jonkel and Cowan 1971, Spencer 1961.

Raccoon

(Procyon lotor)





RANGE: Throughout most of s. Canada and the United States except for the deserts of the Southwest and higher elevations of the Rocky Mountains. Also occurs from Mexico to Panama.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Wooded areas interrupted by fields and water courses. Not usually found in dense forests, commonly found in wetlands near human habitation. Areas where water is available (Kaufman 1982).

SPECIAL HABITAT REQUIREMENTS: A den in any protected area from a culvert to an abandoned woodchuck burrow. Prefers hollow trees. Dens are usually located in trees 10 feet (3 m) or more above ground (Banfield 1974:314) and are located near water.

REPRODUCTION: Age at sexual maturity: 50 percent of females breed as yearlings (Stuewer 1942); remaining breed when 2 years old. Breeding period: Late January to mid-March, peak in February. Gestation period: 63 days to 65 days. Young born: Late April to early May (if the female is not fertilized, a second breeding cycle may begin 2 to 4 months later (Whitney and Underwood 1952). Litter size: 3 to 7 cubs, average 2 to 5 (Asdell 1964. Litters per year: 1.

HOME RANGE: The home range is usually between 0.6 and 1.8 miles, 1 and 3 km in diameter (Kaufman 1982). Size varies with the individual, food availability, and weather. Raccoons have traveled up to 165 miles (264 km) in 164 days (Lynch 1967).

SAMPLE DENSITIES: Densities in New Jersey ranged from 1 raccoon per 1.8 ha (4.4 acres) in woodlands near suburban areas, to 1 raccoon per 18.9 ha (47 acres) in mixed forest and agricultural land (Slate et al. 1982).

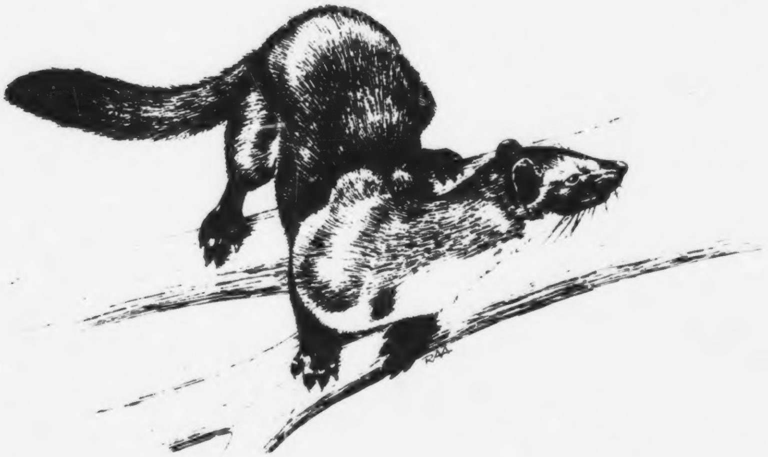
FOOD HABITS: Omnivorous and opportunistic. Animal matter is the major food in spring and early summer. Fruits and seeds are eaten in summer, fall, and winter. Crayfish, worms, insects, carrion, tender buds and shoots, grass, and garbage are typical foods.

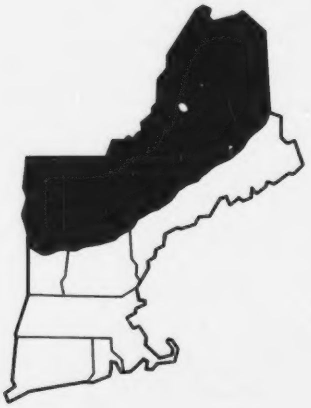
COMMENTS: Primarily nocturnal, may be seen in daylight. Dormant through the winter remaining in dens but not hibernating. An entire family may den together. Raccoons are alert, intelligent animals with a well-developed sense of touch.

KEY REFERENCES: Godin 1977, Hamilton 1936, Lotze and Anderson 1979, Stuewer 1942.

Marten

(Martes americana)





RANGE: Boreal forests of Canada to Alaska s. in the Cascade-Sierra Nevada ranges, and the Rockies into New Mexico; extreme n. Minnesota and Wisconsin and n. New England and New York.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: A diversity of wooded habitats including coniferous forests of fir, spruce and hemlock, dense mixed hardwood-conifer forests, cedar swamps. Softwood dominated mixed stands preferred in undisturbed forest in Maine (Soutiere 1978). In the Adirondacks martens are found in 30-year-old mixed stands, and in pole and mature hardwood stands at elevations of 530 m to 1463 m (1,740 to 4,800 feet) (Brown 1980).

SPECIAL HABITAT REQUIREMENTS: Den sites (hollow trees or logs are most commonly used). Martens seem to have no permanent den site (Godin 1977:217).

REPRODUCTION: Age at sexual maturity: Females: 2 to 3 years old. Males: 1 year. Breeding period: Mid-summer. Peak: July. Gestation period: 220 to 275 days, 27-day delayed implantation. Young born: Early April to mid-May. Litter size: 1 to 5, typically 3 to 4.

HOME RANGE: Average home range is 1 square mile (2.6 km^2) for males and 0.25 square mile (0.65 km^2) for females (Godin 1977:218). Recent work in Maine found that home ranges were 5.5 to 23.5 km^2 (0.7 to 1.1 square miles) for females determined by the modified minimum area polygon method (Major et al. 1981). Adults have been found to range up to 15 square miles (39 km^2) (Marshall 1951). A seasonal altitudinal migration may occur in the mountains (Banfield 1974:316).

FOOD HABITS: Small mammals, especially voles and mice (staples), red squirrels, and chipmunks. Snowshoe hare, grouse, small birds and their eggs, insects and fruits are taken when available, and frogs, toads, reptiles and carrion are also eaten. Active night and day during all seasons. Much of winter hunting is done below snow's surface (Clark and Campbell 1977 cited in Strickland et al. 1982).

COMMENTS: Martens are easily trapped, which may partially explain their decline in the Northeast. Loss of habitat through logging, burning and land clearing are factors contributing to the range and population decrease (Godin 1977:217). Soutiere (1978) found clearcuts reduced marten use for up to 15 years; adequate habitat was provided in selective timber cuts that maintained a pole stage and older residual stand of basal area 20 to 25 m^2/ha (90 to 110 square feet per acre). Currently being reintroduced in the White Mountain National Forest of New Hampshire. This species is commonly called the pine marten.

KEY REFERENCES: Banfield 1974, Burt 1957, Burt and Grossenheider 1976, Godin 1977.

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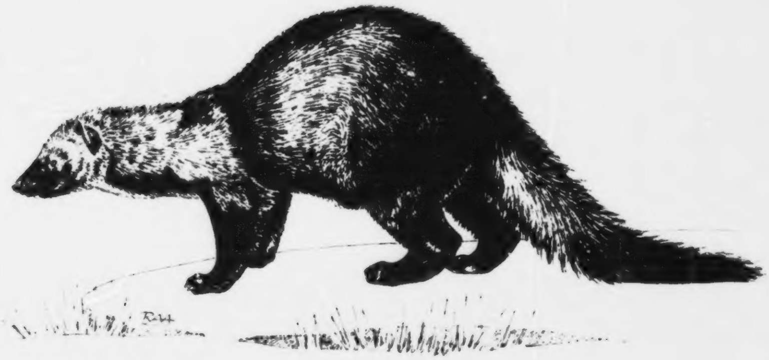
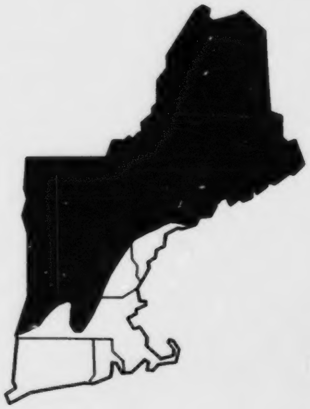
Fisher

(Martes pennanti)





RANGE: Southeastern Labrador w. to se. Alaska s. in the Sierra Nevadas of California and the Rocky Mountains to Wyoming. Also in n. Minnesota, the Adirondacks of New York and the mountain ranges of New England. It is reoccupying former range in the Northeast.

RELATIVE ABUNDANCE IN NEW ENGLAND: Probably common to uncommon.

HABITAT: Extensive forests of mixed hardwoods and conifers. Found less frequently in more open stands or burned areas. Favors wetlands (alder) and mixed softwood-hardwood forest types (Kelly 1977:77). Diverse reports of preferred habitats (Strickland et al. 1982).

SPECIAL HABITAT REQUIREMENTS: Dens in hollow trees, logs, ground holes under large boulders, or vacant porcupine dens. Rarely digs burrow. Dens may be lined with leaves and are often used as temporary shelters during winter storms; does not hibernate.

REPRODUCTION: Age at sexual maturity: Both sexes become mature before their 12th month of age. Females produce first litter when 2 years old (Wright and Coulter 1967). Breeding period: Late February to April. Peak: March. Gestation period: 46 to 51 weeks (Hall 1942), with implantation delayed 9 to 10 months; average 51 weeks. Young born: March to early April. Litter size: 1 to 4 kits, average 3.

HOME RANGE: Kelly (1977) found that yearly ranges averaged 4,747 acres (1,922 ha) and monthly ranges averaged 2,794 acres (1131 ha) in northern New Hampshire. Home range was from 8 to 15 miles (12.8 to 24.0 km) in diameter (Jackson 1961). Hunting circuits may be 60 miles (96 km) in length (Banfield 1974:319). Males range farther than females. Fishers commonly travel along ridges crossing small streams to reach the next ridge (Coulter 1959).

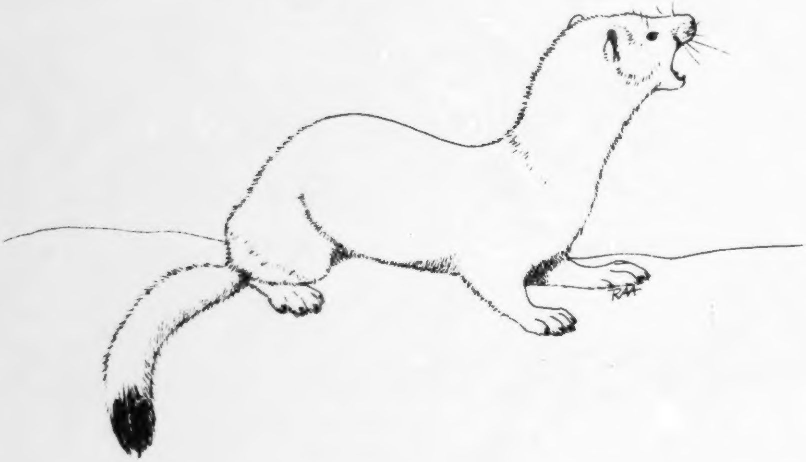
FOOD HABITS: About 80 percent of the fisher's diet is mammals (Banfield 1974:319). They are opportunists taking shrews, mice, squirrels, birds, toads, insects, berries, nuts, and carrion. Porcupines are common and preferred prey of fishers.

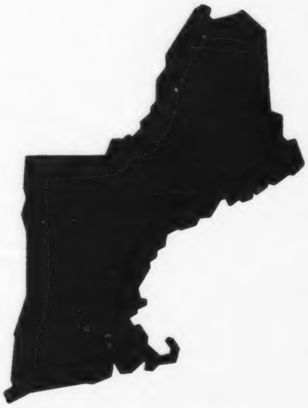
COMMENTS: Fishers are good climbers and are as agile in trees as on ground. Active both day and night, throughout the year.

KEY REFERENCES: Banfield 1974, Burt 1957, Coulter 1966, Godin 1977, Kelly 1977.

Ermine

(Mustela erminea)





RANGE: Throughout Alaska and most of Canada, s. in the United States to s. Pennsylvania and w. Maryland, the Great Lakes region and the nw. quarter of the country.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Wooded or open country with thickets, rock piles or other heavy cover; often close to watercourses.

SPECIAL HABITAT REQUIREMENTS: Small rodents, dense brushy cover.

REPRODUCTION: Age at sexual maturity: Males: Probably 1 year. Females: 3 or 4 months (Jackson 1961:341). Breeding period: July or August. Gestation period: Possibly 9 months (Hamilton 1933b), about 255 days (Jackson 1961:341). Young born: Mid-April to early May. Litter size: 4 to 9, typically 6 or 7.

HOME RANGE: Approximately 30 to 40 acres (12.1 to 16.2 ha) under normal conditions but may extend for 2 or 3 linear miles (3.2 to 4.8 km) per night during periods of food shortage (Jackson 1961:341).

SAMPLE DENSITIES: May reach 20 individuals per square mile (8/km^2) in favorable habitat (Jackson 1961:341).

FOOD HABITS: Mice (staple), chipmunks, moles and shrews, occasionally birds and insects, and rarely snakes, frogs, or fish.

COMMENTS: Den is usually below ground under fallen tree or stump but may also be in abandoned building, stone wall, hollow log, or almost anywhere there is a small dry enclosure. Nocturnal and active throughout the year. Molts to white in winter throughout the Northeast. Formerly short-tailed weasel.

KEY REFERENCES: Hall 1951, Hamilton 1933b, Jackson 1961.

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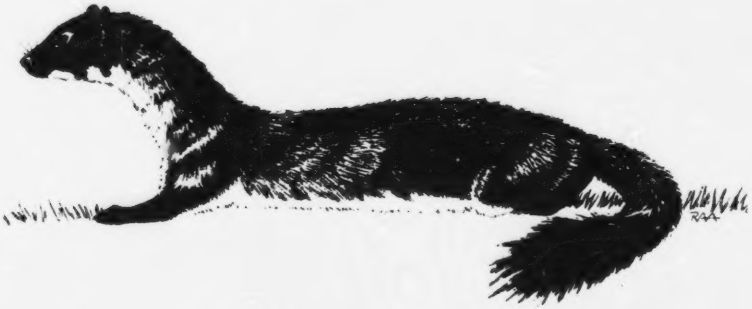
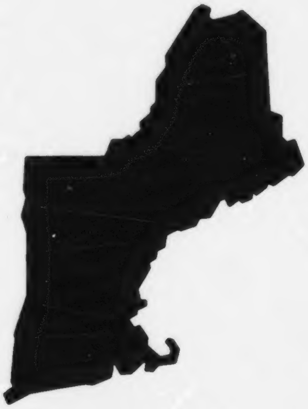
Long-tailed Weasel

(Mustela frenata)





RANGE: Southern Canada to South America. Not found in the sw. deserts of the United States, nw. Mexico or the Baja Peninsula.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Open woods and woodland edges, grasslands, river bottomlands, fencerows. Found in elevations from sea level to the alpine tundra zone. Prefers to be near water.

SPECIAL HABITAT REQUIREMENTS: Uses previously excavated burrows or natural holes or crevices for dens.

REPRODUCTION: Age at sexual maturity: Females: 3 to 4 months. Males: 1 year. Breeding period: July to August. Gestation period: 205 to 337 days, average 279 days (Wright 1942) (approximately 7-1/2 months delayed implantation). Young born: April to May. Litter size: 1 to 12, average 6 to 9 (Wright 1948).

HOME RANGE: Size varies with food availability, cover type, and season. Studies in Wisconsin showed ranges of 30 to 40 acres (12.1 to 16.2 ha) (Jackson 1961) and in Missouri, 400 acres (162 ha) (Schwartz and Schwartz 1959). About 300 acres (121.5 ha) in mixed agricultural-wooded-marsh habitat in southern Michigan. Average cruising radius was 0.3 miles (0.5 km) from den, and the average daily distance traveled by 1 large male was 2 miles (3.2 km) (Quick 1944).

FOOD HABITS: Primarily small mammals including voles, mice, rabbits, shrews; some birds, especially ground nesting species; a few insects and an occasional snake. Small prey is eaten entirely. May climb trees to catch prey.

COMMENTS: Active year long; commonly thought to be mainly nocturnal but often seen active during daylight hours. Some individuals turn white in winter where climate is cold. Molting occurs from mid-October to mid-November and mid-February to mid-April.

KEY REFERENCES: Banfield 1974, Burt and Grossenheider 1976, Godin 1977, Hall 1951, Hamilton 1933b.

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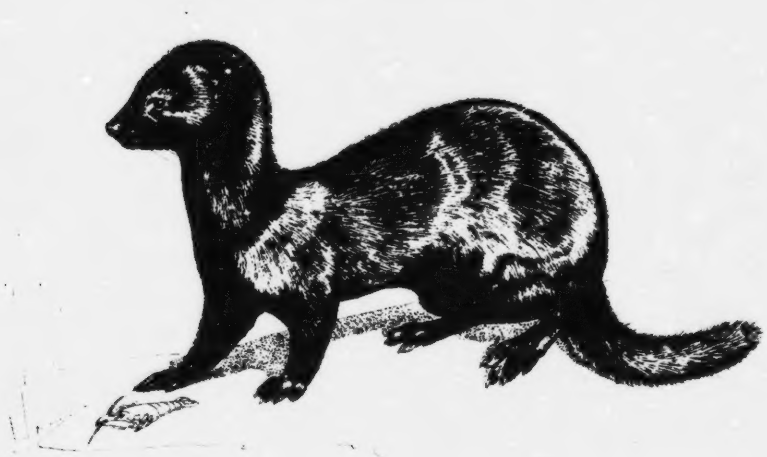
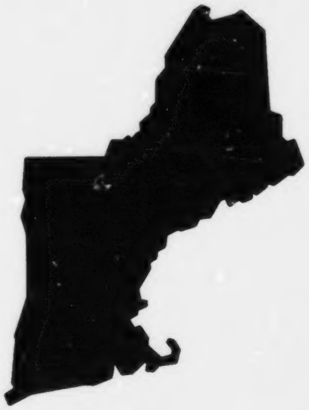
Mink

(Mustela vison)





RANGE: Canada (except high Arctic) w. through Alaska and s. throughout the United States (except the sw. deserts).

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Streambanks, lakeshores, and marshes. Favors forested wetlands with abundant cover such as thickets, rocks, or windfalls.

SPECIAL HABITAT REQUIREMENTS: Den sites inside hollow logs, natural cavities under tree roots or in burrows along stream, marsh, or lake edges.

REPRODUCTION: Age at sexual maturity: 10 months. Breeding period: Late February to early April. Peak: March (Mitchell 1961). Gestation period: 40 to 75 days, average 51 days, 30- to 32-day delayed implantation (Enders 1952). Young born: April or May. Litter size: 2 to 10 kits, average 3 to 4.

HOME RANGE: The average range is 2 to 3 miles (3.2 to 4.8 km) in diameter for males along river in Montana. Two females had home ranges of 19.3 and 50.4 acres (7.8 and 20.4 ha) in similar river habitat. Long distance travel is common along waterways, and in winter mink may swim under the ice. Home ranges often overlap beteen juveniles and adults (Mitchell 1961).

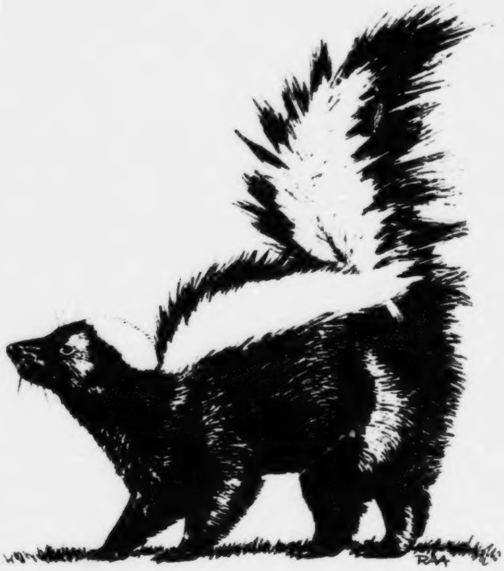
FOOD HABITS: Aquatic and terrestrial prey. Importance of prey items varies with season and habitat (Linscombe et al. 1982). Small mammals, particularly muskrats, voles, rabbits, fish, frogs, salamanders, crayfish, clams and insects. Trails prey by scent and often caches food.

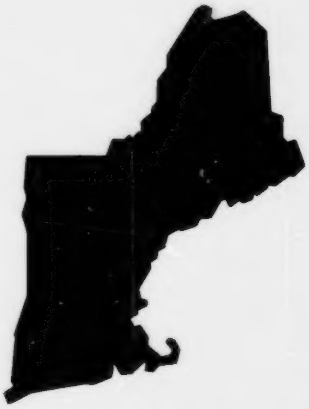
COMMENTS: Molts twice a year. Mainly nocturnal, active year long.

KEY REFERENCES: Banfield 1974, Burt and Grossenheider 1976, Godin 1977, Mitchell 1961.

Striped Skunk

(Mephitis mephitis)





RANGE: Occurs throughout s. Canada, except coastal British Columbia and throughout the United States except the desert regions of the Southwest.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Semi-open country, woods and meadows, agricultural lands, suburban areas, and trash dumps. Occurs from sea level to timberline.

SPECIAL HABITAT REQUIREMENTS: Dens; may be under houses, stumps, in stone walls, rock cavities, or abandoned burrows.

REPRODUCTION: Age at sexual maturity: Spring following birth (Verts 1967). Breeding period: February to late March. Peak: Mid-February. Gestation period: 62 to 68 days. Young born: Late April to early June. Litter size: 2 to 10 kits, typically 6 or 7.

HOME RANGE: Nightly movements cover 0.25 to 0.50 square miles (0.6 to 1.35 km^2) increasing to 4 or 5 square miles (10.4 or 13 km^2) at night during breeding season (Schwartz and Schwartz 1959).

SAMPLE DENSITIES: 31 skunks per square mile (12/km^2) during autumn peak on a 1.13-square-mile (2.93 km^2) area of farmland, shrub and wooded ravine habitat in Pennsylvania (Jones 1939). 58 square miles (22/km^2) in winter on good habitat in Michigan (Burt 1948:149).

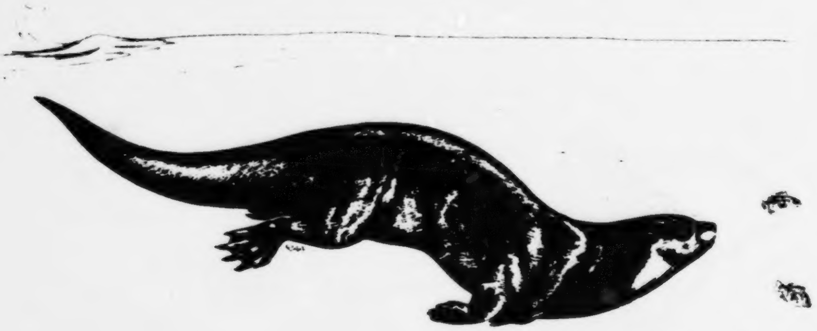
FOOD HABITS: Omnivorous diet includes insects, snails, small rodents, birds eggs, fruits, grains, nuts, corn, grasses, buds, berries, garbage, and carrion. In summer diet may be as much as 43 percent insects (Banfield 1974:339).

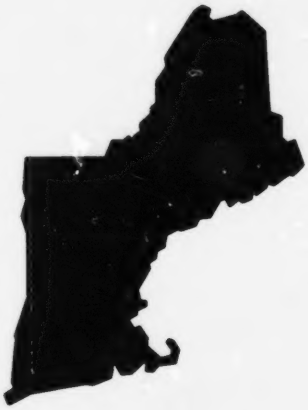
COMMENTS: Semi-hibernates during the winter months; young may remain in den with mother. Crepuscular or nocturnal, sometimes active during daylight hours. Not efficient burrowers but can excavate dens.

KEY REFERENCES: Banfield 1974, Burt and Grossenheider 1976, Godin 1977, Verts 1967.

River Otter

(Lutra canadensis)





RANGE: Throughout all but northernmost portions of Canada and Alaska and in all states of the United States. Does not occur in deserts or treeless regions.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon, but probably more common than sightings and trapping would indicate.

HABITAT: Borders of streams, lakes or other wetlands in forested areas.

SPECIAL HABITAT REQUIREMENTS: Body of water such as stream, pond, lake, river; suitable den sites.

REPRODUCTION: Age at sexual maturity: Possibly 2 years (Hamilton and Eadie 1964). Breeding period: March or April, followed by a 10- or 11-month delayed implantation. Gestation period: 9 to 12 months (Hamilton and Eadie 1964). Young born: March or April. Litter size: 1 to 5, average 2 or 3. Litters per year: 1.

HOME RANGE: 15 or more linear miles (24 km) (Burt and Grossenheider 1976), 20 or 30 linear miles (32 or 48 km) for a pair or male but usually less than 1 mile (1.6 km) for females with young (Jackson 1961:384). Territories maintained within home range (Erlinge 1968).

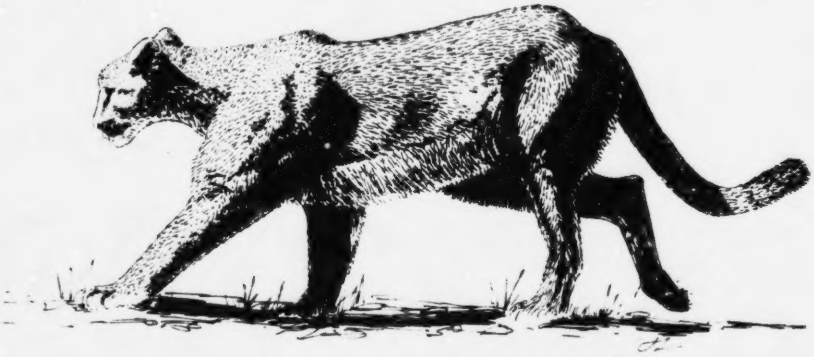
FOOD HABITS: Aquatic animals especially fish, frogs, crayfish, salamanders, and turtles. Also takes snakes, small birds, mammals, earthworms, and insects.

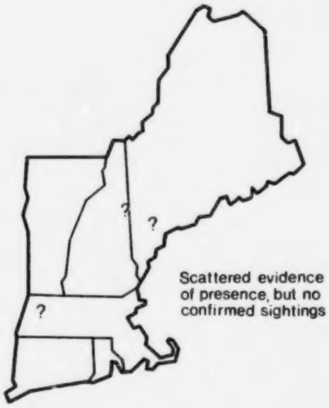
COMMENTS: May be active at any time; dawn to midmorning and evening hours are the periods of most activity (Melquist and Hornocker 1979). Active throughout the year. Den may be in crevice in rocky ledge, under fallen tree, in abandoned beaver lodge or muskrat house or in dense thickets bordering water.

KEY REFERENCES: Jackson 1961, Hamilton and Eadie 1964, Liers 1951.

Mountain Lion

(Felis concolor)

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Scattered evidence of presence, but no confirmed sightings

RANGE: Southern Canada s. in the w. mountains of the United States to South America, with remnant populations in Florida and possibly New Brunswick.

RELATIVE ABUNDANCE IN NEW ENGLAND: Extirpated. No known breeding population.

HABITAT: Historically used a variety of habitat. If stragglers are present today, they probably inhabit remote mountain forests, swamps, and wooded watercourses.

SPECIAL HABITAT REQUIREMENTS: Isolation from man. Requires abundant supply of deer for prey.

REPRODUCTION: Age at sexual maturity: 2 or 3 years. Breeding period: Throughout the year (every 2 or 3 years). Gestation period: About 3 months. Young born: Throughout the year (spring-born cubs have highest survival rates in the North). Litter size: 1 to 6, typically 2 or 3.

HOME RANGE: May range 20 or 30 linear miles (32 to 48 km) during hunting trips (Hamilton and Whitaker 1979:310). Home ranges in the Northeast are not known. Western home ranges may exceed 30 sqare miles (78 km^2) (Wright 1973). Separate home ranges maintained in summer and winter, following movements of deer and elk (Dixon 1982).

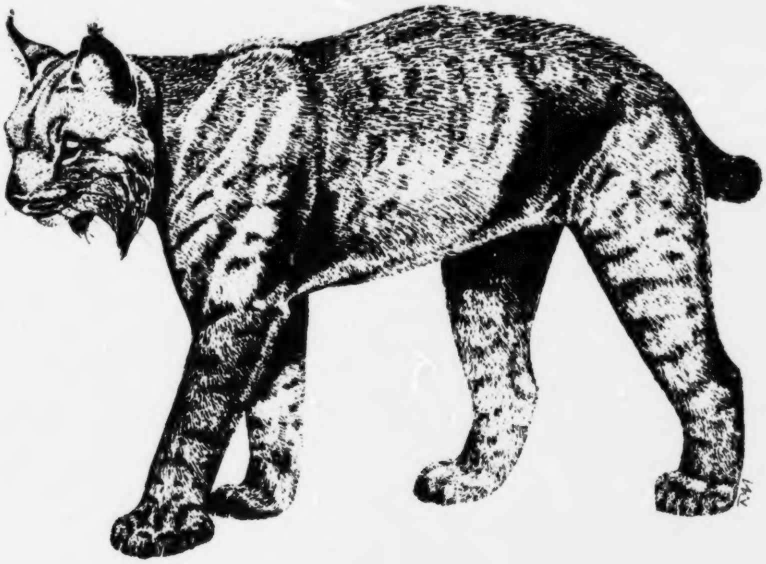
FOOD HABITS: Nocturnal. Feeds on deer, foxes, beavers, porcupine, raccoons, skunks, rabbits, and smaller mammals. Caches large prey.

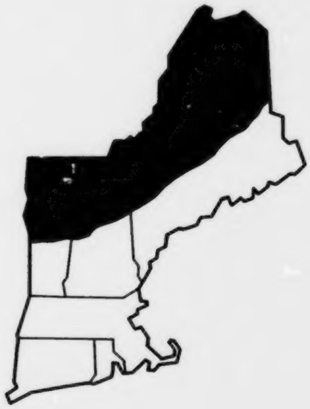
COMMENTS: There is little if any evidence of a breeding population in the northeastern United States. A sparse population may exist in the southeastern states although evidence is not clear. There is a small population in Florida (Dixon 1982). Many unconfirmed sightings in New England and one confirmed track cast (R. Downing, personal communication). Some stragglers may be escapees from zoos or others may be kept illegally as pets. Also called the cougar.

KEY REFERENCES: Hamilton and Whitaker 1979, Young and Goldman 1946.

Lynx

(Felis lynx)





RANGE: Newfoundland w. to Yukon Territory and Alaska s. in the United States to n. Oregon, n. Wisconsin, and n. New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Interiors of extensive, unbroken forests well removed from human activity. Favors swamps, bogs, or rocky areas. Selected successional habitat on Cape Breton Island (Parker 1982).

SPECIAL HABITAT REQUIREMENTS: Secluded den sites, extensive forests.

REPRODUCTION: Age at sexual maturity: 1 year, may vary with prey abundance (McCord and Cardoza 1982). Breeding period: January to February. Gestation period: About 62 days. Young born: May to early June. Litter size: 1 to 4. Litters per year: 1.

HOME RANGE: About 5 square miles (13 km^2) during breeding season (Burt and Grossenheider 1976). 6 to 8 square miles (16 to 21 km^2) with 2.6-mile (4.2-km) daily cruising radius (Banfield 1974:350). Adult home ranges were larger in summer 25 to 32 km^2 (9.6 to 12.3 square miles) than winter 12 to 18 km^2 (4.6 to 6.9 square miles) on Cape Breton Island. Cruising distance was 9 km (5.6 miles) in summer and 8 km (4.9 miles) in winter (Parker 1982).

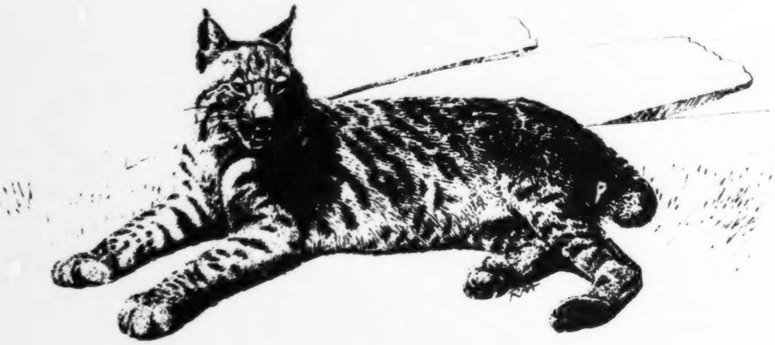
FOOD HABITS: Mainly snowshoe hare (staple), rodents, and birds. Occasionally carrion of deer or caribou. Lynx populations fluctuate with snowshoe hare abundance reaching peak numbers about once every 10 years.

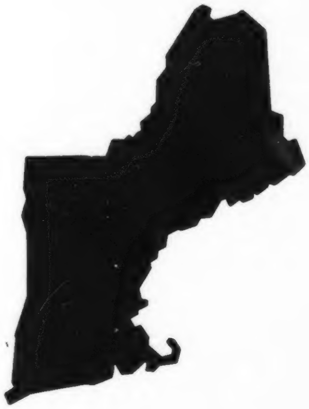
COMMENTS: Mainly nocturnal and solitary; active throughout the year. Rears young in den which may be among rocks, under fallen tree, in a hollow log, or other sheltered place.

KEY REFERENCES: Banfield 1974, Godin 1977, Saunders 1963a, 1963b, Siegler 1971.

Bobcat

(Felis rufus)





RANGE: Southern Canada s. throughout the w. half of the United States and through the e. uplands and mountains. Also occurs along the Gulf Coast and in Florida. Reintroduced to n. New Jersey in 1978 (Lund 1980).

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Mixed deciduous-coniferous and hardwood forests and brushy and rocky woodlands broken by fields, old roads and farmland. Frequently found in cedar swamps and spruce thickets. Favors areas with thick undergrowth. Softwood cover preferred in winter (May 1982).

SPECIAL HABITAT REQUIREMENTS: Rocky ledges critical in Massachusetts (McCord and Cardoza 1982). Prefers to den in rock crevices, under windfalls, or in hollow logs. The den is usually lined with dried grasses, leaves, and moss.

REPRODUCTION: Age at sexual maturity: Females mature within a year after birth. Males mature during second year (Crowe 1975). Breeding period: Late February to March, sometimes extending into June. Gestation period: About 62 days. Young born: Late April to mid-May. Litter size: 1 to 4 kittens, average 2. Litters per year: Second litter sometimes born in early August. May be regularly polyestrus in the southern portion of the range (Banfield 1974:353).

HOME RANGE: 2 to 5 linear miles (3.2 to 8 km) for nightly travel in Massachusetts (Pollack 1951). McCord (1977) estimated 26 to 31 acres (10.5 to 12.5 ha) in Massachusetts. In Maine, mean annual home range was 23 km^2 (8.9 square miles), winter ranges were 30 percent larger than summer ranges (May 1982). In the Catskills, home range was approximately 36 km^2 (14 square miles) for males and 31.0 km^2 (12 square miles) for females; Adirondack ranges were estimated to be 325 km^2 (125 square miles) for males and 86 km^2 (33 square miles) for females (Fox and Brocke 1983). Ranges farther to find mates or follow prey. In Minnesota, Bobcats traveled 3 to 7 miles (4.8 to 11.2 km) while hunting (Rollings 1945).

FOOD HABITS: Small mammals, especially snowshoe hare, cottontails, squirrels, mice, birds and their eggs. Deer is a principal winter diet component in New York (Fox and Brocke 1983). Carrion (untainted), snakes, fish, crustaceans, insects, and some vegetation are also eaten. Most prey is taken by stalking.

COMMENTS: Favors established routes and uses scent posts. Solitary and elusive, mainly nocturnal but in winter is active during daylight. Avoids crossing bodies of water (generally) but can swim well (Godin 1977:241).

KEY REFERENCES: Banfield 1974, Godin 1977, McCord 1974, Rollings 1945, Siegler 1971.

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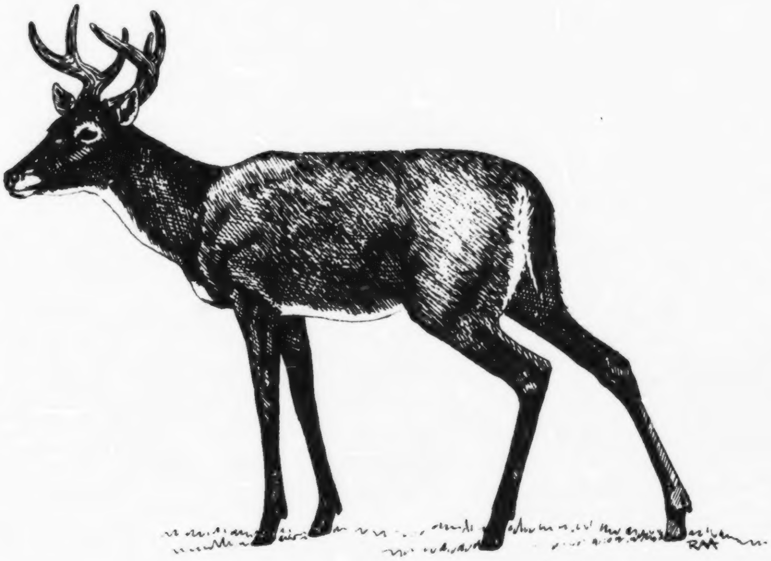
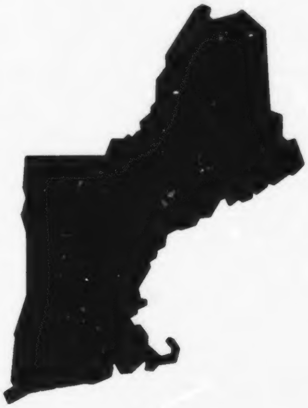
White-tailed Deer

(Odocoileus virginianus)





RANGE: Across s. Canada to c. British Columbia and throughout the United States, except for most of California, Nevada, Utah, and w. Colorado. Range extends into South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Forest edges, swamp borders, areas interspersed with fields and woodland openings. During winter months when snow depth exceeds 16 inches (40.6 cm) Deer will "yard" in stands of conifers, forming a central resting area with trails packed through the snow.

SPECIAL HABITAT REQUIREMENTS: Dense cover for winter shelter, adequate browse.

REPRODUCTION: Age at sexual maturity: Some females mate as yearlings, most males and females are mature at 18 months. Breeding period: Late October to mid-December. Peak: November. Gestation period: 201 days. Young born: May and June with an extreme spread from March to September. Litter size: 1 to 4 fawns, average 2.

HOME RANGE: 2 to 3 square miles (5.2 to 7.8 km^2). Size depends on the quality of the habitat. Home range is from 40 acres (16.2 ha) in excellent habitat to 300 acres (121.5 ha) in poor habitat (Banfield 1974:392).

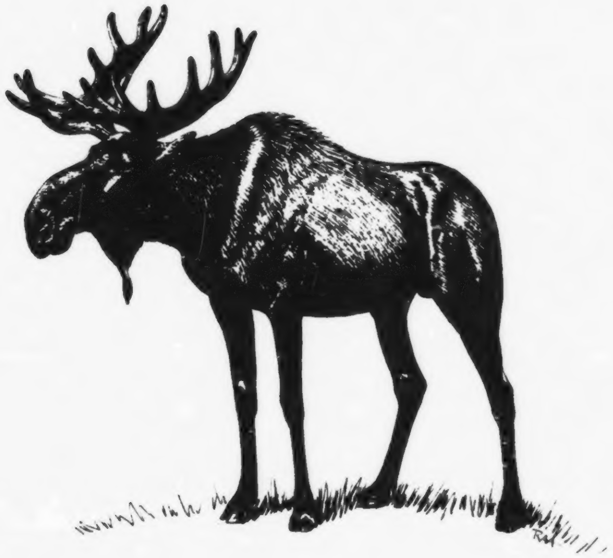
FOOD HABITS: Mainly crepuscular. Deer browse on a variety of woody deciduous plants and some coniferous growth, feeding on twigs and stripping young bark. Also graze on grasses, herbs and mushrooms, and grub for roots. Adaptable in its food habits.

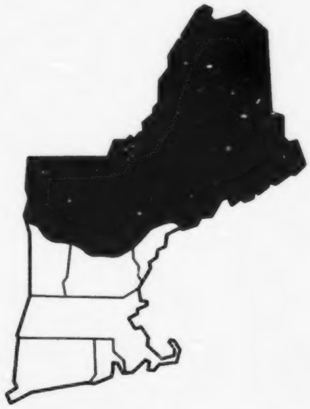
COMMENTS: Gregarious, usually forming small groups. Family groups consisting of a doe with her fawns and yearlings are (sometimes) common in the late fall.

KEY REFERENCES: Banfield 1974, Godin 1977, Taylor 1956.

Moose

(Alces alces)





RANGE: Alaska, the s. half of Canada, n. New England and the n. Rockies into Utah.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Second-growth boreal forests interspersed with semi-open areas and swamps or lakes that offer cover and aquatic plants for food. Climax stands of balsam fir, white birch, and aspen seral stands are preferred habitat. Summers are spent near water; winters in drier mixed hardwood-conifer forests.

SPECIAL HABITAT REQUIREMENTS: Wetlands preferred in summer for relief from mosquitos and flies and for aquatic plant food items.

REPRODUCTION: Age at sexual maturity: Some females may mature at 16 months and produce young in their second year (Peterson 1955:99). Most males probably mature at 1-1/2 years but are unable to breed until 5 or 6 years old due to competition from older bulls. Breeding period: Early September to late October. Peak: Mid-September. Gestation period: 240-246 days. Young born: Late May to early June. Litter size: 1, rarely 2.

HOME RANGE: Probably a radius of 2 to 10 miles (3.2 to 16 km) if adequate year-round food supply is available (Peterson 1955:113). Seasonal home ranges of 5 to 10 km^2 (2 to 4 square miles) throughout North America (LeResche 1974). In an area with 5- to 50-year-old patch clearcuts in northern Maine, the home range of females was 11 to 43 km^2 in summer and 3.37 km^2 in winter (Crossley and Gilbert 1983). Bulls will range farther during breeding season.

SAMPLE DENSITIES: In Eastern North America, the average density is 1 moose per 5 square miles (13 km^2) over much of its range; 2 or more moose per square mile (0.8/km^2) approaches carrying capacity (Peterson 1955:202).

FOOD HABITS: During summer they prefer to feed in or near clearings, burns or shoreline areas where they browse on tender leaves, twigs and bark of deciduous trees, and semi-aquatic and aquatic vegetation. They also graze on grasses, lichens, mosses, mushrooms, and herbaceous plants. Winter diet is restricted to conifer (especially balsam fir) and hardwood twigs.

COMMENTS: Populations are increasing in Maine and northern New Hampshire. Moose in mountainous regions generally seek lower elevations in autumn (Edwards and Ritcey 1956). They may gather together in yards during winter and congregate in lily ponds during summer months but are mainly solitary animals. They are most active at dawn and dusk.

KEY REFERENCES: Banfield 1974, Godin 1977, Murie 1934, Peterson 1955.

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APPENDIX

Special Status Designations

Many wildlife species or subspecies in New England are protected by state or federal legislation, by hunting regulations, or have been noted by private conservation groups as species deserving special consideration due to their relative scarcity. Because of the variety of regulations and legislation that exists for different species within the six-state region, we have not attempted to define or list any of these special status categories. Instead, we have listed all the species or subspecies that have a special status designation, and we have indicated the applicable state (not necessarily included in state regulations). These categories have been determined by either a private group or a state agency and include such designations as state endangered, threatened, or rare.

If interested in further information regarding a species' status in a particular state, the user should contact the state agency with jurisdiction over wildlife, the Natural Heritage Program of The Nature Conservancy in that state, or the Audubon Society chapter, and so on. Species that are covered by state hunting laws are not included in this list.

AMPHIBIANS

	ME	NH	VT	MA	RI	CT
Mudpuppy, *Necturus m. maculosus*			*	*	*	*
Marbled Salamander, *Ambystoma opacum*		*		*	*	*
Jefferson Salamander, *Ambystoma jeffersonianum*		*	*	*		*
Silvery Salamander, *Ambystoma platineum*			*			
Blue-spotted Salamander, *Ambystoma laterale*	*	*	*	*		*
Tremblay's Salamander, *Ambystoma tremblayi*	*		*			
Slimy Salamander, *Plethodon g. glutinosus*		*		*		*
Northern Spring Salamander, *Gyrinophilus p. porphyriticus*	*	*	*	*		*
Eastern Spadefoot, *Scaphiopus h. holbrookii*				*	*	*
Fowler's Toad, *Bufo woodhousii fowleri*	*	*				
Mink Frog, *Rana septentrionalis*	*	*	*			

REPTILES

	ME	NH	VT	MA	RI	CT
Stinkpot, *Sternotherus odoratus*			*			
Spotted Turtle, *Clemmys guttata*	*	*	*	*	*	*
Bog Turtle, *Clemmys muhlenbergii*			*	*		*
Wood Turtle, *Clemmys insculpta*	*	*	*	*	*	*
Eastern Box Turtle, *Terrapene c. carolina*	*	*		*	*	*
Map Turtle, *Graptemys geographica*			*			
Plymouth Redbelly Turtle, *Pseudemys rubriventris bangsi*				*		
Blanding's Turtle, *Emydoidea blandingii*	*	*		*		*
Eastern Spiny Softshell, *Trionyx s. spiniferus*			*			
Five-lined Skink, *Eumeces fasciatus*			*	*		*
Eastern Hognose Snake, *Heterodon platyrhinos*		*			*	*
Eastern Worm Snake, *Carphophis a. amoenus*	*			*	*	*
Eastern Smooth Green Snake, *Opheodrys v. vernalis*					*	
Black Rat Snake, *Elaphe o. obsoleta*		*	*	*	*	*
Northern Copperhead, *Agkistrodon contortrix mokeson*				*	*	
Timber Rattlesnake, *Crotalus horridus*		*	*	*	*	*

BIRDS

	ME	NH	VT	MA	RI	CT
Common Loon, *Gavia immer*	*	*	*	*		*
Pied-billed Grebe, *Podilymbus podiceps*	*	*	*	*	*	*
American Bittern, *Botaurus lentiginosus*	*	*	*	*	*	*
Least Bittern, *Ixobrychus exilis*	*	*	*	*	*	*
Black-crowned Night-heron, *Nycticorax nycticorax*	*		*	*	*	*
Yellow-crowned Night-heron, *Nycticorax violaceus*						*
Glossy Ibis, *Plegadis falcinellus*	*	*		*	*	*
Hooded Merganser, *Lophodytes cucullatus*						*
Common Merganser, *Mergus merganser*						*
Red-breasted Merganser, *Mergus serrator*			*			
Osprey, *Pandion haliaetus*	*	*	*	*	*	*
Bald Eagle, *Haliaeetus leucocephalus*	*	*		*		
Northern Harrier, *Circus cyaneus*	*	*	*	*		
Sharp-shinned Hawk, *Accipiter striatus*				*	*	*
Cooper's Hawk, *Accipiter cooperii*	*	*	*	*	*	*

BIRDS

	ME	NH	VT	MA	RI	CT
Northern Goshawk, *Accipiter gentilis*				*		
Red-shouldered Hawk, *Buteo lineatus*	*	*	*	*	*	*
Golden Eagle, *Aquila chrysaetos*	*					
Merlin, *Falco columbarius*	*	*				
Peregrine Falcon, *Falco peregrinus*	*	*	*	*		*
Spruce Grouse, *Dendragapus canadensis*			*			
King Rail, *Rallus elegans*		*		*	*	*
Sora, *Porzana carolina*		*	*			
Common Moorhen, *Gallinula chloropus*	*	*	*	*	*	
American Coot, *Fulica americana*			*	*		
Piping Plover, *Charadrius melodus*	*			*	*	*
Upland Sandpiper, *Bartramia longicauda*	*	*	*	*	*	*
Black Tern, *Chlidonias niger*	*	*	*			
Common Barn-Owl, *Tyto alba*	*	*	*	*	*	*
Long-eared Owl, *Asio otus*		*	*	*	*	*
Short-eared Owl, *Asio flammeus*	*	*	*	*		
Whip-poor-will, *Caprimulgus vociferus*		*				
Red-headed Woodpecker, *Melanerpes erythrocephalus*	*	*	*	*	*	
Three-toed Woodpecker, *Picoides tridactylus*	*	*	*			
Black-backed Woodpecker, *Picoides arcticus*		*	*			
Olive-sided Flycatcher, *Contopus borealis*				*		*
Acadian Flycatcher, *Empidonax virescens*				*	*	
Horned Lark, *Eremophila alpestris*						*
Cliff Swallow, *Hirundo pyrrhonota*					*	
Purple Martin, *Progne subis*		*		*		*
Gray Jay, *Perisoreus canadensis*		*	*			
Carolina Wren, *Thryothorus ludovicianus*			*			
Winter Wren, *Troglodytes troglodytes*					*	
Sedge Wren, *Cistothorus platensis*	*	*	*	*	*	*
Golden-crowned Kinglet, *Regulus satrapa*						*
Eastern Bluebird, *Sialia sialis*		*				*
Gray-cheeked Thrush, *Catharus minimus*				*		
Loggerhead Shrike, *Lanius ludovicianus*	*	*	*	*		*
Golden-winged Warbler, *Vermivora chrysoptera*	*	*	*	*		*
Northern Parula, *Parula americana*				*	*	*
Magnolia Warbler, *Dendroica magnolia*					*	
Yellow-rumped Warbler, *Dendroica coronata*					*	
Pine Warbler, *Dendroica pinus*		*				
Cerulean Warbler, *Dendroica cerulea*			*			
Kentucky Warbler, *Oporornis formosus*						*
Wilson's Warbler, *Wilsonia pusilla*			*			
Yellow-breasted Chat, *Icteria virens*			*		*	
Vesper Sparrow, *Pooecetes gramineus*				*		
Savannah Sparrow, *Passerculus sandwichensis*					*	
Grasshopper Sparrow, *Ammodramus savannarum*	*	*	*	*	*	*
Henslow's Sparrow, *Ammodramus henslowii*		*	*	*		*
White-throated Sparrow, *Zonotrichia albicollis*				*		
Orchard Oriole, *Icterus spurius*	*	*				
Pine Grosbeak, *Pinicola enucleator*	*					
Evening Grosbeak, *Coccothraustes vespertinus*					*	

MAMMALS

	ME	NH	VT	MA	RI	CT
Water Shrew, *Sorex palustris*				*	*	*
Smoky Shrew, *Sorex fumeus*					*	
Long-tailed or Rock Shrew, *Sorex dispar*	*	*	*	*		
Least Shrew, *Cryptotis parva*						*
Indiana Myotis, *Myotis sodalis*		*	*	*		
Small-footed Myotis, *Myotis leibii*	*	*	*	*		*
New England Cottontail, *Sylvilagus transitionalis*		*			*	
Northern Flying Squirrel, *Glaucomys sabrinus*						*
Deer Mouse, *Peromyscus maniculatus*						*
Rock Vole, *Microtus chrotorrhinus*	*	*	*			
Southern Bog Lemming, *Synaptomys cooperi*		*		*	*	*
Northern Bog Lemming, *Synaptomys borealis*	*					
Woodland Jumping Mouse, *Napaeozapus insignis*					*	
Porcupine, *Erethizon dorsatum*		*	*			
Black Bear, *Ursus americanus*						*
Marten, *Martes americana*		*	*			*
Fisher, *Martes pennanti*						*
Eastern Cougar or Mountain Lion, *Felis concolor cougar*						
Lynx, *Felis lynx*	*	*	*			
Bobcat, *Felis rufus*					*	

Coastal and Migrant Species

Species	**Season**	**Habitat**
Coastal		
Northern Diamondback Terrapin *Malaclemys t. terrapin*	permanent resident	coastal marshes
Red-throated Loon *Gavia stellata*	winter	coastal bays
Horned Grebe *Podiceps auritus*	winter	coastal bays
Red-necked Grebe *Podiceps grisegena*	winter	coastal bays
Leach's Storm-Petrel *Oceanodroma leucorhoa*	breeding	coastal rocks
Great Cormorant *Phalacrocorax carbo*	permanent resident	coastal rocks
Double-crested Cormorant *Phalacrocorax auritus*	breeding	coastal rocks
Great Egret *Casmerodius albus*	breeding	coastal marsh

Species	Season	Habitat
Snowy Egret *Egretta thula*	breeding	coastal marsh
Little Blue Heron *Egretta caerulea*	breeding	coastal marsh— persistent emergent vegetation
Tricolored Heron *Egretta tricolor*	breeding	coastal marsh
Cattle Egret* *Bubulcus ibis*	breeding	coastal marsh
Snow Goose *Chen caerulescens*	winter	coastal bays, estuaries
Brant *Branta bernicla*	winter	coastal bays
Redhead* *Aythya americana*	winter	coastal bays
Greater Scaup *Aythya marila*	winter	coastal bays, esthuaries
Lesser Scaup *Aythya affinis*	winter	coastal bays, estuaries
Common Eider *Somateria mollissima*	breeding and winter	coastal bays, ocean
King Eider *Somateria spectabilis*	winter	coastal bays, ocean
Harlequin Duck *Histrionicus histrionicus*	winter	coastal bays
Oldsquaw *Clangula hyemalis*	winter	coastal bays, ocean
Black Scoter *Melanitta nigra*	winter	coastal bays, ocean
Surf Scoter *Melanitta perspicillata*	winter	coastal bays, ocean
White-winged Scoter *Melanitta fusca*	winter	coastal bays, ocean
Barrow's Goldeneye *Bucephala islandica*	winter	coastal bays, ocean
Ruddy Duck *Oxyura jamaicensis*	breeding (rare)	coastal marshes, bays winter

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*Found inland on rare occasions.

Species	Season	Habitat
Clapper Rail *Rallus longirostris*	permanent resident	coastal marsh
Black-bellied Plover *Pluvialis squatarola*	winter	coastal mud flat
Piping Plover* *Charadrius melodus*	breeding	coastal beach
American Oystercatcher *Haematopus palliatus*	breeding	coastal beach, rocks
Willet *Catoptrophorus semipalmatus*	breeding	coastal beach
Whimbrel *Numenius phaeopus*	migrant	coastal mud flat
Hudsonian Godwit *Limosa haemastica*	migrant	coastal mud flat
Marbled Godwit *Limosa fedoa*	migrant	coastal mud flat
Ruddy Turnstone *Arenaria interpres*	winter	coastal mud flat
Red Knot *Calidris canutus*	winter	coastal mud flat
Semipalmated Sandpiper *Calidris pusilla*	migrant	coastal mud flat
White-rumped Sandpiper *Calidris fuscicollis*	migrant	coastal marsh, mud flat
Baird's Sandpiper *Calidris bairdii*	migrant	coastal marsh, mud flat
Pectoral Sandpiper *Calidris melanotos*	migrant	coastal marsh, mud flat
Purple Sandpiper *Calidris maritima*	winter	coastal rocks
Dunlin *Calidris alpina*	winter	coastal beach
Stilt Sandpiper *Calidris himantopus*	migrant	coastal marsh, mud flat
Short-billed Dowitcher *Limnodromus griseus*	migrant	coastal marsh, mud flat
Red-necked Phalarope *Phalaropus lobatus*	migrant	coastal marsh, estuary, ocean

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* Threatened in New England (Federal Register 50 (238): 50726-50734).

Species	**Season**	**Habitat**
Red Phalarope *Phalaropus fulicaria*	migrant	coastal marsh, estuary, ocean
Laughing gull *Larus atricilla*	breeding	coast
Bonaparte's Gull *Larus philadelphia*	winter	coast
Iceland Gull *Larus glaucoides*	winter	coast
Glaucous Gull *Larus hyperboreus*	winter	coast
Roseate Tern *Sterna dougallii*	breeding	coastal beach
Arctic Tern *Sterna paradisaea*	breeding	coastal beach
Least Tern *Sterna antillarum*	breeding	coastal beach
Black Skimmer *Rynchops niger*	breeding	coastal beach
Razorbill *Alca torda*	breeding and winter	coastal rocks
Black Guillemot *Cepphus grylle*	breeding and winter	coastal rocks
Atlantic Puffin *Fratercula arctica*	breeding and winter	coastal rocks
Dickcissel *Spiza americana*	breeding, permanent resident	coastal marsh
Sharp-tailed Sparrow *Ammodramus caudacutus*	breeding, coastal marsh permanent resident	coastal marsh
Seaside Sparrow *Ammodramus maritimus*	permanent resident	coastal marsh
Migrants		
Greater Yellowlegs *Tringa melanoleuca*	migrant	
	spring	fresh and coastal marshes
	fall	coastal marsh
Lesser Yellowlegs *Tringa flavipes*	migrant	
	spring	fresh and coastal marshes
	fall	coastal marsh

Species	**Season**	**Habitat**
Solitary Sandpiper *Tringa solitaria*	migrant	fresh marsh
Sanderling *Calidris alba*	winter	ocean beach
Least Sandpiper *Calidris minutilla*	migrant	marshes, mud flats
Water Pipit *Anthus spinoletta*	migrant	plowed fields
Orange-crowned Warbler *Vermivora celata*	migrant	woodlands
White-crowned Sparrow *Zonotrichia leucophrys*	migrant	field edges
Other		
Black-tailed Jackrabbit *Lepus californicus*		Introduced on Nantucket Island, Massachusetts

Guild Designations for Inland Wildlife of New England

C — Carnivore
I — Insectivore
O — Omnivore
H — Herbivore
P — Piscivore
G — Granivore
F — Frugivore

Common Name	Summer Foraging	Breeding Substrate	Winter Foraging
Mudpuppy	C : Water Ambusher	Water	C : Water Ambusher
Marbled Salamander	I : Ground Gleaner	Water	
Jefferson Salamander	I : Ground Glenaer	Water	
Silvery Salamander	I : Ground Gleaner	Water	
Blue-spotted Salamander	I : Ground Gleaner	Water	
Tremblay's Salamander	I : Ground Glenaer	Water	
Spotted Salamander	I : Ground Gleaner	Water	
Red-spotted Newt	I : Water Gleaner	Water	I : Water Gleaner
Northern Dusky Salamander	I : Water Gleaner	Riparian Subsurface	I : Water Gleaner
Mountain Dusky Salamander	I : Ground Gleaner	Terrestrial Subsurface	
Redback Salamander	I : Ground Gleaner	Terrestrial Subsurface	I : Ground Gleaner
Slimy Salamander	I : Ground Gleaner	Terrestrial Subsurface	
Four-toed Salamander	I : Ground Gleaner	Riparian Ground	
Northern Spring Salamander	I : Water Gleaner	Water	I : Water Gleaner
Northern Two-lined Salamander	I : Water Gleaner	Water	I : Water Gleaner
Eastern Spadefoot	I : Ground Ambusher	Water	
Eastern American Toad	I : Ground Ambusher	Water	
Fowler's Toad	I : Ground Ambusher	Water	
Northern Spring Peeper	I : Riparian Ambusher	Water	
Gray Treefrog	I : Bark Ambusher	Water	
Bullfrog	C : Water Ambusher	Water	
Green Frog	C : Riparian Ambusher	Water	
Mink Frog	I : Water Ambusher	Water	
Wood Frog	I : Ground Ambusher	Water	
Northern Leopard Frog	I : Riparian Ambusher	Water	
Pickerel Frog	I : Riparian Ambusher	Water	
Common Snapping Turtle	O : Bottom Forager	Riparian Subsurface	O : Bottom Forager
Stinkpot	C : Bottom Forager	Riparian Subsurface	
Spottled Turtle	O : Bottom Forager	Riparian Subsurface	
Bog Turtle	O : Riparian Forager	Riparian Ground	
Wood Turtle	O : Ground Forager	Terrestrial Subsurface	
Eastern Box Turtle	O : Ground Forager	Terrestrial Subsurface	
Map Turtle	O : Bottom Forager	Terrestrial Subsurface	
Red-eared Slider	O : Bottom Forager	Terrestrial Subsurface	
Plymouth Redbelly Turtle	H : Water Grazer	Riparian Subsurface	
Eastern Painted Turtle	O : Bottom Forager	Terrestrial Subsurface	
Midland Painted Turtle	O : Bottom Forager	Riparian Subsurface	O : Bottom Forager
Blanding's Turtle	O : Bottom Forager	Riparian Subsurface	
Eastern Spiny Softshell	I : Water Ambusher	Riparian Subsurface	
Five-lined Skink	I : Ground Ambusher	Terrestrial Subsurface	
Northern Water Snake	C : Water Ambusher	Riparian Subsurface	
Northern Brown Snake	I : Ground Ambusher	Terrestrial Subsurface	
Northern Redbelly Snake	I : Ground Ambusher	Terrestrial Subsurface	
Eastern Garter Snake	C : Ground Ambusher	Terrestrial Subsurface	
Maritime Garter Snake	I : Ground Ambusher	Terrestrial Subsurface	
Eastern Ribbon Snake	C : Ground Ambusher	Riparian Subsurface	
Northern Ribbon Snake	C : Water Ambusher	Riparian Subsurface	
Eastern Hognose Snake	C : Ground Ambusher	Terrestrial Subsurface	
Northern Ringneck Snake	C : Ground Ambusher	Terrestrial Subsurface	
Eastern Worm Snake	I : Ground Gleaner	Terrestrial Subsurface	
Northern Black Racer	C : Ground Ambusher	Terrestrial Subsurface	
Eastern Smooth Green Snake	I : Ground Ambusher	Terrestrial Subsurface	
Black Rat Snake	C : Ground Ambusher	Terrestrial Subsurface	
Eastern Milk Snake	C : Ground Ambusher	Terrestrial Subsurface	
Northern Copperhead	C : Ground Ambusher	Terrestrial Subsurface	

Common Name	Summer Foraging	Breeding Substrate	Winter Foraging
Timber Rattlesnake	C : Ground Ambusher	Terrestrial Subsurface	
Common Loon	P : Water Diver	Riparian Subsurface	P : Ocean Diver
Pied-billed Grebe	O : Bottom Forager	Water	O : Bottom Forager
American Bittern	C : Water Ambusher	Riparian Ground	
Least Bittern	C : Water Ambusher	Riparian Herb-Shrub	
Great Blue Heron	C : Water Ambusher	Riparian Twig-Branch	
Green-backed Heron	C : Water Ambusher	Riparian Shrub	
Black-crowned Night-Heron	C : Water Ambusher	Riparian Twig-Branch	C : Water Ambusher
Yellow-crowned Night-Heron	C : Water Ambusher	Riparian Twig-Branch	
Glossy Ibis	O : Riparian Prober	Riparian Ground	
Mute Swan	H : Water Grazer	Riparian Ground	H : Water Grazer
Canada Goose	H : Ground Grazer	Riparian Ground	H : Ground Grazer
Wood Duck	G : Water Forager	Riparian Tree Cavity	
Green-winged Teal	H : Water Grazer	Riparian Ground	H : Water Grazer
American Black Duck	O : Water Forager	Riparian Ground	O : Water Forager
Mallard	G : Water Forager	Riparian Ground	O : Water Forager
Norther Pintail	O : Water Forager		
Blue-winged Teal	O : Water Forager	Riparian Ground	
Northern Shoveler	O : Water Forager	Riparian Ground	O : Water Forager
Gadwall	H : Water Grazer	Riparian Ground	H : Water Grazer
American Widgeon	H : Water Grazer	Riparian Ground	H : Water Grazer
Canvasback			O : Ocean Bottom Forager
Ring-necked Duck	O : Bottom Forager	Riparian Ground	H : Bottom Forager
Common Goldeneye	O : Bottom Forager	Riparian Tree Cavity	O : Bottom Forager
Bufflehead	O : Bottom Forager	Riparian Tree Cavity	O : Bottom Forager
Hooded Merganser	P : Water Diver	Riparian Tree Cavity	P : Water Diver
Common Merganser	P : Water Diver	Riparian Tree Cavity	P : Water Diver
Red-breasted Merganser	P : Water Diver	Riparian Ground	P : Ocean Diver
Turkey Vulture	C : Ground Scavenger	Ground-Herb	C : Ground Scavenger
Osprey	P : Water Foot-Plunger	Tree Branch	
Bald Eagle	P : Water Foot-Plunger	Tree Branch	C : Ground Scavenger
Northern Harrier	C : Ground Pouncer	Riparian Ground	C : Ground Pouncer
Sharp-shinned Hawk	C : Air Hawker	Tree-Branch	C : Air Hawker
Cooper's Hawk	C : Air Hawker	Tree-Branch	C : Air Hawker
Northern Goshawk	C : Air Hawker	Tree-Branch	C : Air Hawker
Red-shouldered Hawk	C : Ground Pouncer	Tree-Branch	C : Ground Pouncer
Broad-winged Hawk	C : Ground Pouncer	Tree-Branch	
Red-tailed Hawk	C : Ground Pouncer	Tree-Branch	C : Ground Pouncer
Rough-legged Hawk			C : Ground Pouncer
Golden Eagle	C : Ground Pouncer	Cliff	C : Ground Pouncer
American Kestrel	C : Ground Pouncer	Tree-Branch	C : Ground Pouncer
Merlin	C : Air Hawker	Tree-Branch	C : Air Hawker
Peregrine Falcon	C : Air Hawker	Cliff	
Gray Partridge	O : Ground Gleaner	Ground-Herb	G : Ground Gleaner
Ring-necked Pheasant	O : Ground Gleaner	Ground-Herb	O : Ground Gleaner
Spruce Grouse	O : Ground Gleaner	Ground-Herb	H : Upper Canopy Forager
Ruffed Grouse	O : Ground Gleaner	Ground-Herb	H : Upper Canopy Forager
Wild Turkey	O : Ground Gleaner	Ground-Herb	G : Ground Gleaner
Bobwhite	O : Ground Gleaner	Ground Herb	O : Ground Gleaner
King Rail	I : Coastal Prober	Riparian Ground	O : Coastal Prober
Virginia Rail	O : Riparian Gleaner	Riparian Ground	O : Riparian Gleaner
Sora	O : Riparian Gleaner	Riparian Ground	
Common Moorhen	O : Riparian Gleaner	Riparian Ground	
American Coot	O : Bottom Forager	Riparian Ground	H : Bottom Forager
Killdeer	I : Ground Gleaner	Ground-Herb	I : Ground Gleaner
Spotted Sandpiper	O : Riparian Gleaner	Ground-Herb	

Common Name	**Summer Foraging**	**Breeding Substrate**	**Winter Foraging**
Upland Sandpiper	I : Ground Gleaner	Ground-Herb	
Common Snipe	I : Water Gleaner	Riparian Ground	I : Water Gleaner
American Woodcock	I : Ground Prober	Ground-Herb	
Ringed-billed Gull			
Herring Gull	C : Coastal Scavenger	Beach-Rock-Dune	C : Coastal Scavenger
Great Black-backed Gull	C : Coastal Scavenger	Beach-Rock-Dune	C : Coastal Scavenger
Common Tern	P : Water Plunger	Beach-Rock-Dune	
Black Tern	I : Water Gleaner	Ground-Herb	
Rock Dove	O : Ground Gleaner	Buildings	O : Ground Gleaner
Mourning Dove	G : Ground Gleaner	Tree-Branch	G : Ground Gleaner
Black-billed Cuckoo	I : Lower Canopy Gleaner	Tree-Branch	
Yellow-billed Cuckoo	I : Lower Canopy Gleaner	Tree-Branch	
Common Barn-Owl	C : Ground Pouncer	Buildings	C : Ground Pouncer
Eastern Screech-Owl	C : Ground Pouncer	Tree Cavity-Crevice	C : Ground Pouncer
Great Horned Owl	C : Ground Pouncer	Tree-Branch	C : Ground Pouncer
Snowy Owl			
Northern Hawk-Owl			
Barred Owl	C : Ground Pouncer		C : Ground Pouncer
Great Gray Owl			C : Ground Pouncer
Long-eared Owl	C : Ground Pouncer	Tree-Branch	C : Ground Pouncer
Short-eared Owl	C : Ground Pouncer	Beach-Rock-Dune	C : Ground Pouncer
Boreal Owl			C : Ground Pouncer
Northern Saw-whet Owl	C : Ground Pouncer	Tree Cavity-Crevice	C : Ground Pouncer
Common Nighthawk	I : Air Screener	Ground-Herb	
Whip-poor-will	I : Air Screener	Ground-Herb	
Chimney Swift	I : Air Screener	Buildings	
Ruby-throated Hummingbird	O : Floral Hover-Gleaner	Tree-Branch	
Belted Kingfisher	P : Water Plunger	Riparian Subsurface	P : Water Plunger
Red-headed Woodpecker	I : Bark Gleaner	Tree Cavity-Crevice	I : Bark Gleaner
Red-bellied Woodpecker	I : Bark Gleaner	Tree Cavity-Crevice	I : Bark Gleaner
Yellow-bellied Sapsucker	O : Bark Excavator	Tree Cavity-Crevice	I : Bark Gleaner
Downy Woodpecker	I : Bark Gleaner	Tree Cavity-Crevice	I : Bark Gleaner
Hairy Woodpecker	I : Bark Gleaner	Tree Cavity-Crevice	I : Bark Gleaner
Three-toed Woodpecker	I : Bark Scaler	Tree Cavity-Crevice	I : Bark Scaler
Black-backed Woodpecker	I : Bark Scaler	Tree Cavity-Crevice	I : Bark Scaler
Northern Flicker	I : Ground Gleaner	Tree Cavity-Crevice	O : Ground Gleaner
Pileated Woodpecker	I : Bark Excavator	Tree Cavity-Crevice	I : Bark Excavator
Olive-sided Flycatcher	I : Air Sallier	Tree Branch	
Eastern Wood Pewee	I : Air Sallier	Tree Branch	
Yellow-bellied Flycatcher	I : Air Sallier	Ground-Herb	
Acadian Flycatcher	I : Air Sallier	Tree-Twig	
Alder Flycatcher	I : Air Sallier	Shrub	
Willow Flycatcher	I : Air Sallier	Shrub	
Least Flycatcher	I : Air Sallier	Tree-Branch	
Eastern Phoebe	I : Air Sallier	Buildings	
Great Crested Flycatcher	I : Air Sallier	Tree Cavity-Crevice	
Eastern Kingbird	I : Air Sallier	Tree-Twig	
Horned Lark	O : Ground Gleaner	Ground-Herb	G : Ground Gleaner
Purple Martin	I : Air Screener	Buildings	
Tree Swallow	I : Air Screener	Tree Cavity-Crevice	
Northern Rough-winged Swallow	I : Air Screener	Terrestrial Subsurface	
Bank Swallow	I : Air Screener	Terrestrial Subsurface	
Cliff Swallow	I : Air Screener	Buildings	
Barn Swallow	I : Air Screener	Buildings	
Gray Jay	O : Upper Canopy Gleaner	Tree-Branch	O : Upper Canopy Gleaner
Blue Jay	O : Ground Gleaner	Tree-Branch	O : Ground Gleaner
American Crow	O : Ground Gleaner	Tree-Branch	O : Ground Gleaner
Fish Crow	O : Ground Gleaner	Riparian Twig-Branch	O : Ground Gleaner

Common Name	**Summer Foraging**	**Breeding Substrate**	**Winter Foraging**
Common Raven	C : Ground Scavenger	Cliff	C : Ground Scavenger
Black-capped Chickadee	I : Lower Canopy Gleaner	Tree Cavity-Crevice	O : Lower Canopy Gleaner
Boreal Chickadee	I : Lower Canopy Gleaner	Tree Cavity-Crevice	I : Lower Canopy Gleaner
Tufted Titmouse	I : Lower Canopy Gleaner	Tree Cavity-Crevice	O : Lower Canopy Gleaner
Red-breasted Nuthatch	I : Bark Gleaner	Tree Cavity-Crevice	I : Bark Gleaner
White-breasted Nuthatch	I : Bark Gleaner	Tree-Cavity-Crevice	I : Bark Gleaner
Brown Creeper	I : Bark Gleaner	Tree Cavity-Crevice	I : Bark Gleaner
Carolina Wren	I : Lower Canopy Gleaner	Tree Cavity-Crevice	I : Lower Canopy Gleaner
House Wren	I : Lower Canopy Gleaner	Tree Cavity-Crevice	
Winter Wren	I : Ground Gleaner	Tree Cavity-Crevice	I : Ground Gleaner
Sedge Wren	I : Ground Gleaner	Riparian Ground	
Marsh Wren	I : Ground Gleaner	Riparian Ground	
Golden-crowned Kinglet	I : Lower Canopy Gleaner	Tree-Twig	I : Lower Canopy Gleaner
Ruby-crowned Kinglet	I : Lower Canopy Gleaner	Tree-Twig	I : Lower Canopy Gleaner
Blue-gray Gnatcatcher	I : Upper Canopy Gleaner	Tree-Branch	
Eastern Bluebird	O : Ground Gleaner	Tree Cavity-Crevice	O : Ground Gleaner
Veery	O : Ground Gleaner	Ground-Herb	
Gray-cheeked Thrush	I : Ground Gleaner	Tree-Branch	
Swainson's Thrush	I : Ground Gleaner	Tree-Twig	
Hermit Thrush	I : Ground Gleaner	Ground-Herb	O : Ground Gleaner
Wood Thrush	O : Ground Gleaner	Tree-Branch	
American Robin	O : Ground Gleaner	Tree-Branch	O : Ground Gleaner
Gray Catbird	O : Ground Gleaner	Shrub	
Northern Mockingbird	O : Ground Gleaner	Shrub	F : Lower Canopy Gleaner
Brown Thrasher	O Ground Gleaner	Shrub	O : Ground Gleaner
Bohemian Waxwing			
Cedar Waxwing	F : Upper Canopy Gleaner	Tree-Twig	F : Upper Canopy Gleaner
Northern Shrike			C : Ground Pouncer
Loggerhead Shrike	C : Ground Pouncer	Tree-Twig	C : Ground Pouncer
European Starling	O : Ground Gleaner	Buildings	O : Ground Gleaner
White-eyed Vireo	I : Lower Canopy Gleaner	Tree-Twig	
Solitary Vireo	I : Upper Canopy Gleaner	Tree-Twig	
Yellow-throated Vireo	I : Upper Canopy Gleaner	Tree-Twig	
Warbling Vireo	I : Upper Canopy Gleaner	Tree-Twig	
Philadelphia Vireo	I : Upper Canopy Gleaner	Tree-Twig	
Red-eyed Vireo	I : Upper Canopy Gleaner	Tree-Twig	
Blue-winged Warbler	I : Lower Canopy Gleaner	Ground-Herb	
Golden-winged Warbler	I : Lower Canopy Gleaner	Ground-Herb	
Tennessee Warbler	I : Upper Canopy Gleaner	Ground-Herb	
Nashville Warbler	I : Lower Canopy Gleaner	Ground-Herb	
Northern Parula	I : Upper Canopy Gleaner	Tree-Branch	
Yellow Warbler	I : Lower Canopy Gleaner	Shrub	
Chestnut-sided Warbler	I : Lower Canopy Gleaner	Shrub	
Magnolia Warbler	I : Lower Canopy Gleaner	Tree-Branch	
Cape May Warbler	I : Upper Canopy Gleaner	Tree-Twig	
Black-throated Blue Warbler	I : Lower Canopy Gleaner	Shrub	
Yellow-rumped Warbler	I : Lower Canopy Gleaner	Tree-Branch	O : Lower Canopy Gleaner
Black-throated Green Warbler	I : Upper Canopy Gleaner	Tree-Branch	
Blackburnian Warbler	I : Upper Canopy Gleaner	Tree-Branch	
Pine Warbler	I : Bark Gleaner	Tree-Branch	
Prairie Warbler	I : Lower Canopy Gleaner	Shrub	

Common Name	**Summer Foraging**	**Breeding Substrate**	**Winter Foraging**
Palm Warbler	I : Ground Gleaner	Ground-Herb	G : Ground Gleaner
Bay-breasted Warbler	I : Lower Canopy Gleaner	Tree-Branch	
Blackpoll Warbler	I : Lower Canopy Gleaner	Tree-Branch	
Cerulean Warbler	I : Upper Canopy Gleaner	Tree-Branch	
Black-and-white Warbler	I : Bark Gleaner	Ground-Herb	
American Redstart	I : Lower Canopy Gleaner	Tree-Twig	
Prothonotary Warbler	I : Ground Gleaner	Tree Cavity-Crevice	
Worm-eating Warbler	I : Ground Gleaner	Ground-Herb	
Ovenbird	I : Ground Gleaner	Ground-Herb	
Northern Waterthrush	I : Riparian Gleaner	Riparian Subsurface	
Louisiana Waterthrush	I : Riparian Gleaner	Riparian Subsurface	
Mourning Warbler	I : Ground Gleaner	Ground-Herb	
Common Yellowthroat	I : Lower Canopy Gleaner	Ground-Herb	
Hooded Warbler	I : Lower Canopy Gleaner	Shrub	
Wilson's Warbler	I : Lower Canopy Gleaner	Riparian Ground	
Canada Warbler	I : Lower Canopy Gleaner	Riparian Ground	
Yellow-breasted Chat	O : Lower Canopy Gleaner	Shrub	
Scarlet Tanager	I : Upper Canopy Gleaner	Tree-Twig	
Northern Cardinal	O : Ground Gleaner	Shrub	G : Ground Gleaner
Rose-breasted Grosbeak	O : Lower Canopy Gleaner	Tree-Twig	
Indigo Bunting	I : Lower Canopy Gleaner	Ground-Herb	
Rufous-sided Towhee	O : Ground Gleaner	Ground-Herb	
American Tree Sparrow			G : Ground Gleaner
Chipping Sparrow	O : Ground Gleaner	Shrub	
Field Sparrow	O : Ground Gleaner	Ground-Herb	G : Ground Gleaner
Vesper Sparrow	O : Ground Gleaner	Ground-Herb	
Savannah Sparrow	O : Ground Gleaner	Ground-Herb	O : Ground Gleaner
Grasshopper Sparrow	O : Ground Gleaner	Ground-Herb	
Henslow's Sparrow	O : Ground Gleaner	Ground-Herb	
Fox Sparrow			G : Ground Gleaner
Song Sparrow	O : Ground Gleaner	Ground-Herb	G : Ground Gleaner
Lincoln's Sparrow	O : Ground Gleaner	Ground-Herb	
Swamp Sparrow	I : Ground Gleaner	Riparian Ground	G : Ground Gleaner
White-throated Sparrow	O : Ground Gleaner	Ground-Herb	G : Ground Gleaner
Dark-eyed Junco	O : Ground Gleaner	Ground-Herb	G : Ground Gleaner
Lapland Longspur			G : Ground Gleaner
Snow Bunting			G : Ground Gleaner
Bobolink	O : Ground Gleaner	Ground-Herb	
Red-winged Blackbird	O : Ground Gleaner	Shrub	G : Ground Gleaner
Eastern Meadowlark	I : Ground Gleaner	Ground-Herb	O : Ground Gleaner
Rusty Blackbird	O : Ground Gleaner	Tree-Twig	O : Ground Gleaner
Common Grackle	O : Ground Gleaner	Tree-Branch	O : Ground Gleaner
Brown-headed Cowbird	O : Ground Gleaner	Nest Parasite	G : Ground Gleaner
Orchard Oriole	I : Upper Canopy Gleaner	Tree-Branch	
Northern Oriole	O : Upper Canopy Gleaner	Tree-Twig	
Pine Grosbeak	G : Upper Canopy Gleaner	Tree-Twig	G : Ground Gleaner
Purple Finch	G : Upper Canopy Gleaner	Tree-Branch	G : Ground Gleaner
House Finch	O : Ground Gleaner	Tree-Twig	G : Ground Gleaner
Red Crossbill	G : Upper Canopy Gleaner	Tree-Twig	G : Upper Canopy Gleaner
White-winged Crossbill	G : Upper Canopy Gleaner	Tree-Branch	G : Upper Canopy Gleaner
Common Redpoll			G : Ground Gleaner
Hoary Redpoll			G : Ground Gleaner
Pine Siskin	O : Ground Gleaner	Tree-Branch	G : Ground Gleaner
American Goldfinch	O : Ground Gleaner	Shrub	G : Ground Gleaner
Evening Grosbeak	G : Ground Gleaner	Tree-Twig	G : Ground Gleaner
House Sparrow	G : Ground Gleaner	Buidings	G : Ground Gleaner

Common Name	Summer Foraging	Breeding Substrate	Winter Foraging
Virginia Opossum	O : Ground Forager	Tree Cavity-Crevice	O : Ground Forager
Masked Shrew	I : Ground Gleaner	Terrestrial Subsurface	I : Ground Gleaner
Water Shrew	I : Water Gleaner	Riparian Subsurface	I : Water Gleaner
Smoky Shrew	I : Ground Gleaner	Terrestrial Subsurface	I : Ground Gleaner
Long-tailed Shrew	I : Ground Gleaner	Terrestrial Subsurface	I : Ground Gleaner
Pygmy Shrew	I : Ground Gleaner	Riparian Subsurface	I : Ground Gleaner
Short-tailed Shrew	I : Ground Gleaner	Terrestrial Subsurface	I : Ground Gleaner
Least Shrew	I : Ground Gleaner	Terrestrial Subsurface	I : Ground Gleaner
Hairy-tailed Mole	I : Ground Gleaner	Terrestrial Subsurface	I : Ground Gleaner
Eastern Mole	I : Ground Gleaner	Terrestrial Subsurface	I : Ground Gleaner
Star-nosed Mole	I : Water Gleaner	Riparian Subsurface	I : Water Gleaner
Little Brown Myotis	I : Air Hawker	Buildings	
Keen's Myotis	I : Air Hawker	Tree Cavity-Crevice	
Indiana Myotis	I : Air Hawker	Tree Cavity-Crevice	
Small-footed Myotis	I : Air Hawker	Buildings	
Silver-haired Bat	I : Air Hawker	Tree-Twig	
Eastern Pipistrelle	I : Air Hawker	Cave-Crevice	
Big Brown Bat	I : Air Hawker	Buidings	
Red Bat	I : Air Hawker	Tree-Twig	
Hoary Bat	I : Air Hawker	Tree-Twig	
Eastern Cottontail	H : Ground Grazer	Ground-Herb	H : Bark-Lower Canopy Browser
New England Cottontail	H : Ground Grazer	Ground-Herb	H : Bark-Lower Canopy Browser
Snowshoe Hare	H : Ground Grazer	Ground-Herb	H : Bark-Lower Canopy Browser
European Hare	H : Ground Grazer	Ground-Herb	H : Bark-Lower Canopy Browser
Eastern Chipmunk	G : Ground Forager	Terrestrial Subsurface	
Woodchuck	H : Ground Grazer	Terrestrial Subsurface	
Gray Squirrel	G : Ground Forager	Tree Cavity-Crevice	G : Ground Forager
Red Squirrel	G : Upper Canopy Forager	Tree Cavity-Crevice	G : Ground Forager
Southern Flying Squirrel	G : Ground Forager	Tree Cavity-Crevice	G : Ground Forager
Northern Flying Squirrel	G : Ground Forager	Tree Cavity-Crevice	G : Ground Forager
Beaver	H : Water Grazer	Riparian Subsurface	H : Upper Canopy Browser
Deer Mouse	O : Ground Forager	Terrestrial Subsurface	G : Ground Forager
White-footed Mouse	O : Ground Forager	Terrestrial Subsurface	G : Ground Forager
Southern Red-backed Vole	H : Ground Grazer	Terrestrial Subsurface	H : Ground Forager
Meadow Vole	H : Ground Grazer	Terrestrial Subsurface	H : Ground Forager
Rock Vole	H : Ground Grazer	Terrestrial Subsurface	H : Ground Forager
Woodland Vole	H : Ground Grazer	Terrestrial Subsurface	H : Bark-Lower Canopy Browser
Muskrat	H : Water Grazer	Riparian Subsurface	H : Water Grazer
Southern Bog Lemming	H : Ground Grazer	Ground-Herb	H : Ground Forager
Northern Bog Lemming	H : Ground Grazer	Ground-Herb	H : Ground Forager
Norway Rat	O : Ground Forager	Terrestrial Subsurface	O : Ground Forager
House Mouse	O : Ground Forager	Buildings	O : Ground Forager
Meadow Jumping Mouse	O : Ground Forager	Ground-Herb	
Woodland Jumping Mouse	O : Ground Forager	Ground-Herb	
Porcupine	H : Upper Canopy Browser	Terrestrial Subsurface	H : Upper Canopy Browser
Coyote	O : Ground Forager	Terrestrial Subsurface	O : Ground Scavenger
Red Fox	O : Ground Forager	Terrestrial Subsurface	O : Ground Forager
Gray Fox	O : Ground Forager	Ground-Herb	O : Ground Forager
Black Bear	O : Ground Forager	Cave-Crevice	
Raccoon	O : Ground Forager	Tree Cavity-Crevice	H : Ground Forager
Marten	C : Upper Canopy Pursuer	Tree Cavity-Crevice	H : Upper Canopy Pursuer

Common Name	Summer Foraging	Breeding Substrate	Winter Foraging
Fisher	C : Upper Canopy Pursuer	Tree Cavity-Crevice	H : Upper Canopy Pursuer
Ermine	C : Ground Pursuer	Ground-Herb	C : Ground Pursuer
Long-tailed Weasel	C : Ground Pursuer	Terrestrial Subsurface	C : Ground Pursuer
Mink	P : Water Diver	Riparian Subsurface	P : Water Diver
Striped Skunk	O : Ground Forager	Terrestrial Subsurface	O : Ground Forager
River Otter	P : Water Diver	Riparian Subsurface	P : Water Diver
Mountain Lion	C : Ground Stalker	Ground-Herb	C : Ground Stalker
Lynx	C : Ground Stalker	Ground-Herb	C : Ground Stalker
Bobcat	C : Ground Stalker	Cave-Crevice	C : Ground Stalker
White-tailed Deer	H : Ground Grazer	Ground-Herb	H : Bark-Lower Canopy Browser
Moose	H : Ground Grazer	Ground-Herb	H : Bark-Lower Canopy Browser

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Describes natural history profiles of New England wildlife species and their associations with forested and nonforested habitats. Provides a data base that will enable forest managers or wildlife biologists to describe the species or groups to be found in a given habitat.

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Headquarters of the Northeastern Forest Experiment Station are in Broomall, Pa. Field laboratories are maintained at:

- Amherst, Massachusetts, in cooperation with the University of Massachusetts.
- Berea, Kentucky, in cooperation with Berea College.
- Burlington, Vermont, in cooperation with the University of Vermont.
- Delaware, Ohio.
- Durham, New Hampshire, in cooperation with the University of New Hampshire.
- Hamden, Connecticut, in cooperation with Yale University.
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- Parsons, West Virginia.
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